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NAVAL POSTGRADUATE SCHOOL

Monterey, California

STATISTICAL ANALYSIS FOR THE NONDESTRUCTIVE INSPECTION (NDI) TECHNICIAN PROFICIENCY MEASUREMENT PROGRAM

by

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Prepared for:
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STATISTICAL ANALYSIS FOR THE NONDESTRUCTIVE INSPECTION (NDI) TECHNICIAN PROFICIENCY MEASUREMENT PROGRAM

The Air Force Nondestructive Inspection (NDI) Program is designed to detect damages to aircraft parts and assemblies before they can lead to catastrophic results. The damage assessments are based on quantitative measurements obtained by using several different NDI techniques such as the ultrasonic, eddy-current and the penetrant techniques. All of these techniques require an Air Force technician to read and correctly interpret an associated instrument reading. A recent study [1] has indicated that the reliability of the NDI program falls short of the Air Force requirements because of the high degree of variability in the technician performances. The study recommended a periodic testing of the technicians to evaluate their proficiency, leading to corrective action (retrain) where necessary. These findings and recommendations led to the creation of the Technician Proficiency Measurement Program. The Technician Proficiency Measurement Program consists of administering practical tests involving nondestructive inspection of fabricated flawed aircraft structures, called test racks. Each test rack is made up of several specimen plates with simulated fatigue cracks of various sizes, at randomly selected fastener sites. A technician participating in the program is required to perform a nondestructive inspection using a specified NDI technique to detect the flawed sites and mark his findings on a scoring sheet designed for the purpose. These scoring sheets are to be used to construct a proficiency measure for each of the technicians. This measure is to be the basis for the ranking/grading of the

technicians.

The Lockheed-Georgia company designed and fabricated the test racks. A total of twelve racks, six to be used with the ultrasonic technique and the other six for the eddy-current technique have been manufactured. Each rack has a total of 148 fastener sites of which approximately 30 are flawed with the flaw sizes ranging between .03" and .28". Details of the test rack configuration are available in [2].

The proficiency measurement test was administered at 17 Air Force bases distributed over 6 Air Force commands. A total of 126 technicians using the ultrasonic technique and 134 technicians using the eddy-current technique participated in the test program. The initial summarization of the scoring sheets consisted of determining four aggregate quantities - total number of flawed sites detected, total number of flawed sites missed, the number of false calls (unflawed sites marked as flawed) and the number of unflawed sites correctly identified. The statistical analysis proposed in the NDI Technician Proficiency Test Plan [2] is to compute a well-known statistical quantity called the contingency coefficient. The contingency coefficient multiplied by 10, to be called the C-Score, is to serve as a measure of technician proficiency. One of the drawbacks of this procedure is that it gives equal weights to all the flaws regardless of the flaw size. In other words, a technician who is able to detect small flaws well gets the same amount of credit as another who is only able to detect larger sized flaws. Also, the contingency coefficient method tends to assign an unduly heavy weight to the number of false calls; the primary reason for this phenomenon is

that the ratio of the number of unflawed sites to the number of flawed sites is of the order of 4 to 1. We were, therefore, tasked to develop an alternative proficiency ranking methodology which incorporates the various crack lengths used in the program.

As a first step we computer-coded the original scoring sheets and determined for each technician the number of finds and misses for each of the four flaw size categories, and the unflawed sites. To maintain anonymity we assigned numerical codes to the 152 technicians and the 16 Air Force bases that participated in the program. The results are presented in Appendices IV and V. It should be pointed out that there were some minor differences in the number of finds, misses and false calls between the Lockheed summarization and our computerized results. We used our counts in all the computations of this report.

Our approach to the development of an alternative ranking methodology is to define a scoring system that assigns relatively higher weights to smaller sized flaw detections and appropriately penalizes excessive false calls. The flaw sizes used in the program have been grouped into four categories that we label small (.03" - .05"), medium (.08" - .11"), large (.15" - .18") and X-Large (.23" - .28"). Assuming that the Air Force technicians participating in the test program constitute a random sample, the first step is to estimate the probability that a technician would correctly identify a small, medium, large and an X-Large flawed site, as well as the probability that an unflawed site is identified as such. Based on the results for the 126 ultrasonic and 134 eddy-current technicians, the estimated probabilities are .315, .499, .637, .735 and .687 for the ultrasonic

and .540, .752, .897, .897 and .852 for the eddy- current technique. As is to be expected the detection probabilities increase with flaw size. The set of weights, say W_1, W_2, W_3, W_4, W_5 to be used in computing a technician's score is obtained by taking the reciprocals of the probabilities, normalized to add to unity by dividing by the sum of the reciprocals. For example, the weight W_1 associated with small flaw detections using the ultrasonic technique is $W_1 = (1/.315) \div [(1/.315) + (1/.499) + (1/.637) + (1/.735) + (1/.687)] = .332$; similarly $W_2 = .210$, $W_3 = .164$, $W_4 = .142$ and $W_5 = .152$. The corresponding weights for the eddy-current technique are .281, .202, .169, .169 and .178. An individual technician's "probability score", denoted P- score, is now computable by implementing the following steps:

STEP 1: Compute p_1, p_2, p_3, p_4 the technicians observed proportion of small, medium, large and X-Large flaw detections and p_5 the proportion of unflawed sites correctly identified.

STEP 2: Compute $p_1W_1 + p_2W_2 + p_3W_3 + p_4W_4$ and p_5W_5.

STEP 3: Compute Q the ratio of the total number of fastener sites that are marked as flawed regardless of whether these sites are actually flawed or not, to the total number of inspection sites. Q is a measure of the probability that a technician will correctly detect a flaw purely by chance. In the extreme case when all sites are marked as flawed Q is 1 and the probability is 1 that all flawed sites are correctly identified. Q will be close to 1 and only if there is an excessive number of false calls.

STEP 4: Compute the technician's unadjusted probability score $U = (1-Q)(p_1W_1 + p_2W_2 + p_3W_3 + p_4W_4) + Qp_5W_5$. Note that in this computation each of the flaw detection proportions p_1, p_2, p_3, p_4 gets multiplied by (1-Q) which will have the effect of reducing the impact of the detection rates on the probability score, when Q is high and vice versa. Also, when Q is high, p_5 the proportion of correctly identified unflawed sites will be low and hence the total raw score will tend to be low. This approach to adjusting the score by correcting for flaws caught purely by chance is very similar to the one proposed by Sharp and Sproat [3].

STEP 5: Divide U by $(W_1 + W_2 + W_3 + W_4) + Q(W_5 - W_1 - W_2 - W_3 - W_4)$ to obtain the adjusted probability score. This last step ensures that the maximum value of the score is unity.

The probability score described above has the following properties:

1) A technician with a comparably higher proportion of smaller sized flaw detections will receive a higher score.

2) A technician with a comparably higher number of false calls will receive a lower score.

3) The score will be equal to 1 if and only if all flaws are detected and there are no false calls.

4) The score will be zero if and only if either all unflawed sites are marked as flawed or none of the sites are marked as flawed.

5) The score can be computed for an individual technician or for all of the technicians at a base/command as a group.

The procedure for computing the P-score has been programmed on a Texas Instrument TI-59 Calculator and magnetic cards have been provided to the sponsor. The program listing is in Appendix III.

The P- Score Method assigns more importance to detection of flaws, especially the smaller sized flaws and does not assess as severe a penalty for false calls as the contingency coefficient or C- Score Method does. If it is of interest to penalize false calls more heavily we propose a modification of the P-score for a technician by multiplication with a factor that is indicative of the relative position of the technician's false calls in the distribution of false calls for all of the technicians. If the false calls for a technician is at the high end of the distribution his multiplication factor will be small, and the factor will be large when the number of false calls is small. The maximum value of the multiplication factor is 1 when a technician's false calls is the least among all the technicians. The computational formula for the multiplication factor is the following. Let F_T be the number of false calls for technician T. Then, the multiplication factor for the technician, say M_T is

$$M_T = \frac{\text{No. of Technicians With False Calls At Least As High As } F_T}{\text{Total Number of Technicians}}$$

We have constructed two tables, Tables 11 and 12, one for each of the NDI techniques, of the factor values corresponding to all possible values for the number of false calls. All that needs to be done to compute the modified probability score (MP-Score) for a technician T is:

Step 1: Compute the P score for the technician.

Step 2: Look up the multiplication factor M_T corresponding to his number of false calls F_T from Table 1 or Table 2.

Step 3: Compute MP-Score $= M_T \times$ P-Score.

A second task of our project is to devise a scheme for defining proficiency classes such as poor, fair, good, excellent, etc., for technicians. We propose the use of the quantiles of the distribution of probability scores or the modified probability scores for all the technicians (126 for the ultrasonic and 134 for the eddy-current) participating in the program. Specifically, a technician with a score below the 25th quantile will receive a D-grade (poor or extremely limited), a C (fair or partially proficient) if the score is between the 25th and 50th quantiles, a B (good or competent) for a score between the 50th and 75th quantiles, and an A (excellent or highly proficient) if the score exceeds the 75th quantile. This grading scheme can be applied to the contingency scores also. The 25th, 50th and 75th quantiles (Q25,Q50,Q75) of the distributions of probability scores, modified probability scores and the contingency scores and the associated grading schemes are presented in Tables 1-6 below.

Table 1

Quantiles Of The Distribution of Probability Scores
Ultrasonic Method

Quantile	Value	Proficiency Grade Limits	Proficiency Grade
Q25	.373	0<score≤.373	D
Q50	.485	.373<score≤.485	C
Q75	.588	.485<score≤.588	B
		score>.588	A

Table 2

Quantiles of The Distribution of Probability Scores
Eddy-Current Method

Quantile	Value	Proficiency Grade Limits	Proficiency Grade
Q25	.614	0<score≤.614	D
Q50	.764	.614<score≤.764	C
Q75	.854	.764<score≤.854	B
		score>.854	A

Table 3

Quantiles Of The Distribution of Modified Probability Scores
Ultrasonic Method

Quantile	Value	Proficiency Grade Limits	Proficiency Grade
Q25	.111	0<score≤.111	D
Q50	.224	.111<score≤.224	C
Q75	.350	.224<score≤.350	B
		score>.350	A

Table 4

Quantile Of The Distribution Of Modified Probability Scores
Eddy-Current Method

Quantile	Value	Proficiency Grade Limits	Proficiency Grade
Q25	.167	$\emptyset$<score$\leq$.167	D
Q50	.386	.167<score$\leq$.386	C
Q75	.595	.386<score$\leq$.595	B
		score>.595	A

Table 5

Quantiles Of The Distribution of Contingency Scores
Ultrasonic Method

Quantile	Value	Proficiency Grade Limits	Proficiency Grade
Q25	$\emptyset$.37	$\emptyset$<score$\leq\emptyset$.37	D
Q50	2.17	$\emptyset$.37<score$\leq$2.17	C
Q75	3.15	2.17<score$\leq$3.15	B
		score>3.15	A

Table 6

Quantiles Of The Distribution of Contingency Scores
Eddy-Current Method

Quantile	Value	Proficiency Limits	Proficiency Grade
Q25	4.29	0<score≤4.29	D
Q50	6.48	4.29<score≤6.48	C
Q75	7.57	6.48<score≤7.57	B
		score>7.57	A

Histograms of the scores using the three different scoring methods are in Figures 1-6.

An approach similar to the one used to determine proficiency grades may be adopted to determine if a technician's "false calls" are in the acceptable, marginal or unacceptable range. We propose the use of the 50th and 75th quantiles of the distribution of false calls to set the range limits as shown in Table 7 below. If these limits are too severe, the 75th and 90th quantiles (see Table 10) may be used to define the limits.

Table 7
False Calls (FC) Acceptance Limits

NDI Technique	Acceptable Limits	Marginal Limits	Unacceptable Limits
Ultrasonic	$0<FC\leq 31$	$31<FC\leq 48$	$FC>48$
Eddy-Current	$0<FC\leq 11$	$11<FC\leq 23$	$FC>23$

The results of our computations of the probability scores, the modified probability scores, the associated linear ranking of the technicians within an AF base and the proficiency grades are presented in Tables 13-43. We have included in these tables the corresponding data for the contingency coefficient method for comparative purposes. Note that these contingency scores do not agree, in some cases, with the scores computed by the Lockheed Georgia Company because of the differences in the summarized values. We also include in this report some additional analyses we performed with the data from the original scoring sheets. Table 8 contains the statistics of the false call distributions. Detection probabilities together with 90% confidence intervals for the four flaw size categories are in Table 9. Table 10 is similar to Table 11 except that the probabilities and confidence intervals apply to each individual flaw size. A breakdown of detection probabilities for each of the AF commands is in Appendix I and Appendix II contains a hole by hole analysis for each of the T-bars and splice plates used in the test racks.

REFERENCES

[1] "Reliability of Nondestructive Inspections - Final Report", Report No. SA-ALC/MNE 76-6-38-1, Dec. 1978.

[2] "Test Plan - NDI Technical Proficiency", November 1980.

[3] "Treatment of False Calls in Evaluating Nondestructive Inspection Proficiency" by Henry Sharp Jr., and William H. Sproat.

TABLE 8

STATISTICS OF FALSE CALLS

	Ultrasonic	Eddy-Current
MEAN X	36.90	17.3
ST·DEV S	23.50	18.9
X + S	60.4	36.1
X + 2S	83.9	55.0
X + 3S	107.0	73.8
MIN	1	0
MAX	111	110
Q25	20	4
Q50	31	11
Q75	48	23
Q90	73	40

TABLE 9

90% Confidence Intervals for Probability of Flaw Detection by Flaw Size Categories

	ULTRASONIC			EDDY-CURRENT	
Flaw Size Category	Detection Probability	Lower Bound	Upper Bound	Detection Probability	Lower Bound
Small	.315	.281	.349	.540	.518
Medium	.499	.477	.521	.752	.733
Large	.637	.615	.659	.897	.879
X-Large	.735	.706	.764	.897	.875
No Flaws	.687	.681	.693	.852	.847

	EDDY-CURRENT				ULTRASONIC			
Flaw Size (Inches)	No. of Detextion Opportunities	Probability of Detection	Lower Bound	Upper Bound	No. of Detection Opportunities	Probability of Detection	Lower Bound	Upper Bound
.03	288	.472	.429	.525	60	.450	.372	.575
.04	850	.554	.527	.583	362	.298	.264	.342
.05	202	.574	.523	.636	82	.293	.235	.396
.08	283	.774	.736	.817	178	.399	.348	.468
.09	596	.760	.732	.790	653	.525	.495	.559
.10	524	.739	.709	.772	497	.509	.475	.548
.11	71	.704	.629	.801	58	.414	.338	.542
.15	120	.825	.773	.885	223	.565	.516	.624
.16	429	.900	.877	.924	656	.657	.628	.689
.17	255	.925	.899	.953	298	.678	.637	.725
.18	0	0	0	0	67	.537	.458	.652
.19	0	0	0	0	16	.500	.387	.758
.23	0	0	0	0	56	.643	.558	.760
.24	131	.878	.834	.927	120	.742	.683	.812
.25	208	.913	.882	.946	195	.749	.702	.803
.26	148	.892	.853	.935	148	.723	.668	.787
.27	12	.917	.794	1.000	98	.776	.714	.850
.28	0	0	0	0	13	.692	.554	.936
.30	37	.892	.819	.980	0	0	0	0

TABLE 11

TABLE OF MULTIPLICATION FACTORS
FOR COMPUTING MODIFIED PROBABILITY
SCORES FROM THE PROBABILITY SCORES

FACTORS FOR ULTRASONIC SCORES

FALSE CALLS	MULTIPLICATION FACTOR
0	1.000
1	1.000
2	0.992
3	0.976
4	0.968
5	0.960
6	0.937
7	0.929
8	0.929
9	0.905
10	0.889
11	0.873
12	0.873
13	0.865
14	0.865
15	0.865
16	0.857
17	0.849
18	0.841
19	0.825
20	0.794
21	0.746
22	0.730
23	0.706
24	0.690
25	0.659
26	0.643
27	0.619
28	0.587

FALSE CALLS	MULTIPLICATION FACTOR
29	0.587
30	0.563
31	0.524
32	0.500
33	0.468
34	0.444
35	0.444
36	0.429
37	0.429
38	0.421
39	0.421
40	0.397
41	0.373
42	0.349
43	0.349
44	0.333
45	0.317
46	0.302
47	0.286
48	0.262
49	0.254
50	0.230
51	0.206
52	0.190
53	0.183
54	0.183
55	0.175
56	0.175
57	0.175
58	0.159

FALSE CALLS	MULTIPLICATION FACTOR
59	C.159
60	C.151
61	C.151
62	C.143
63	C.143
64	C.143
65	C.143
66	C.143
67	C.135
68	C.127
69	C.127
70	C.119
71	C.111
72	C.111
73	C.111
74	C.095
75	C.087
76	C.079
77	C.071
78	C.064
79	C.056
80	C.056
81	C.056
82	C.056
83	C.056
84	C.056
85	C.048
86	C.048
87	C.040
88	C.040

FALSE CALLS	MULTIPLICATION FACTOR
89	0.040
90	0.040
91	0.040
92	0.040
93	0.040
94	0.040
95	0.032
96	0.032
97	0.032
98	0.024
99	0.016
100	0.016
101	0.016
102	0.016
103	0.016
104	0.008
105	0.008
106	0.008
107	0.008
108	0.008
109	0.008
110	0.008
111	0.008
112	0.000
113	0.000
114	0.000
115	0.000
116	0.000
117	0.000
118	0.000

FALSE CALLS	MULTIPLICATION FACTOR
119	C.00C
120	C.00C
121	C.00C
122	C.00C
123	C.00C
124	C.00C
125	C.00C
126	C.00C

TABLE 12

TABLE OF MULTIPLICATION FACTORS
FOR COMPUTING MODIFIED PROBABILITY
SCORES FROM THE PROBABILITY SCORES

FACTORS FOR EDDY-CURRENT SCORES

FALSE CALLS	MULTIPLICATION FACTOR
0	1.000
1	0.933
2	0.873
3	0.851
4	0.784
5	0.694
6	0.664
7	0.627
8	0.604
9	0.567
10	0.545
11	0.507
12	0.493
13	0.478
14	0.448
15	0.440
16	0.418
17	0.396
18	0.381
19	0.358
20	0.328
21	0.313
22	0.291
23	0.269
24	0.254
25	0.246
26	0.239
27	0.231
28	0.231

FALSE CALLS	MULTIPLICATION FACTOR
29	0.209
30	0.179
31	0.179
32	0.172
33	0.149
34	0.149
35	0.149
36	0.134
37	0.127
38	0.127
39	0.119
40	0.119
41	0.104
42	0.104
43	0.104
44	0.104
45	0.104
46	0.082
47	0.075
48	0.075
49	0.075
50	0.075
51	0.067
52	0.067
53	0.067
54	0.067
55	0.060
56	0.052
57	0.052
58	0.052

FALSE CALLS	MULTIPLICATION FACTOR
59	0.052
60	0.045
61	0.037
62	0.037
63	0.037
64	0.037
65	0.037
66	0.030
67	0.030
68	0.030
69	0.030
70	0.030
71	0.030
72	0.030
73	0.030
74	0.030
75	0.022
76	0.022
77	0.022
78	0.022
79	0.022
80	0.022
81	0.022
82	0.022
83	0.022
84	0.022
85	0.022
86	0.022
87	0.022
88	0.022

FALSE CALLS	MULTIPLICATION FACTOR
89	0.022
90	0.022
91	0.022
92	0.022
93	0.022
94	0.022
95	0.015
96	0.015
97	0.015
98	0.015
99	0.015
100	0.015
101	0.015
102	0.015
103	0.015
104	0.015
105	0.015
106	0.015
107	0.015
108	0.015
109	0.015
110	0.015
111	0.007
112	0.007
113	0.007
114	0.007
115	0.007
116	0.007
117	0.007
118	0.007

FALSE CALLS	MULTIPLICATION FACTOR
119	0.007
120	0.007
121	0.007
122	0.007
123	0.007
124	0.007
125	0.007
126	0.007
127	0.007
128	0.007
129	0.007
130	0.007
131	0.007
132	0.007
133	0.007
134	0.007

The tables following this page contain the technician scores, their linear ranking and their proficiency grades. The nomenclature used in these tables is:

P-Score	=	Probability Score
MP-Score	=	Modified Probability Score
C-Score	=	Contingency Coefficient Score
S	=	Score
R	=	Linear Ranking of a Technician Within the Base
G	=	Proficiency Grade

ULTRASONIC METHOD

TABLE 13

NDI TECHNICIAN PROFICIENCY SCORES

NDI TECHNIQUE: ULTRASONIC

A.F.COMMAND: ALC A.F.BASE: B1

TECH	P SCORE			M.P SCORE			C SCORE			FALSE
CODE	S	R	G	S	R	G	S	R	G	CALLS
T113	0.673	2	A	0.673	1	A	8.71	1	A	1
T026	0.651	3	A	0.646	2	A	8.27	2	A	2
T018	0.537	6	B	0.533	3	B	7.81	3	A	2
T041	0.536	7	B	0.498	5	B	6.66	4	A	8
T087	0.585	4	B	0.497	6	B	5.89	5	A	17
T108	0.429	9	C	0.402	8	C	5.72	6	A	6
T109	0.765	1	A	0.528	4	B	5.64	7	A	24
T021	0.420	10	C	0.390	9	C	5.35	8	A	8
T098	0.550	5	B	0.476	7	C	4.84	9	A	15
T049	0.350	11	D	0.311	11	D	3.87	10	A	10
T073	0.509	8	B	0.351	10	D	3.54	11	A	24

TABLE 14

NDI TECHNICIAN PROFICIENCY SCORES

NDI TECHNIQUE: ULTRASONIC

A.F.COMMAND: ALC A.F.BASE: B2

TECH	P SCORE			M.P SCORE			C SCORE			FALSE
CODE	S	R	G	S	R	G	S	R	G	CALLS
T134	0.696	4	A	0.647	2	A	7.63	1	A	8
T144	0.664	5	A	0.590	3	A	7.08	2	A	10
T133	0.452	16	C	0.438	7	C	6.65	3	A	4
T043	0.838	1	A	0.652	1	A	6.17	4	A	19
T038	0.432	18	C	0.415	9	C	5.92	5	A	5
T031	0.707	2	A	0.584	4	B	5.40	6	A	19
T011	0.634	7	A	0.463	6	C	5.07	8	A	22
T061	0.373	20	D	0.358	13	D	5.10	7	A	5
T010	0.602	10	A	0.425	8	C	4.71	9	A	23
T121	0.639	6	A	0.360	12	D	4.56	10	A	30
T090	0.472	15	C	0.412	10	C	4.43	11	A	12
T020	0.633	8	A	0.472	5	C	4.39	12	A	21
T117	0.702	3	A	0.368	11	D	4.21	13	A	31
T046	0.578	11	B	0.183	20	D	2.84	15	B	45
T135	0.624	9	A	0.312	14	D	3.06	14	B	32
T093	0.532	12	B	0.224	19	D	2.23	18	B	39
T142	0.313	23	D	0.269	16	D	2.71	16	B	16
T145	0.333	21	D	0.243	18	D	2.34	17	B	22
T122	0.447	17	C	0.252	17	D	2.15	19	C	30
T152	0.509	13	B	0.287	15	D	1.87	20	C	30
T029	0.421	19	C	0.027	22	D	0.00	21	D	78
T148	0.326	22	D	0.129	21	D	0.00	21	D	40
T013	0.478	14	C	0.008	23	D	0.00	21	D	103

TABLE 15

NDI TECHNICIAN PROFICIENCY SCORES

NDI TECHNIQUE: ULTRASONIC

A.F.COMMAND: ANG A.F.BASE: B3

TECH	P SCORE			M.P SCORE			C SCORE			FALSE
CODE	S	R	G	S	R	G	S	R	G	CALLS
T105	0.584	7	B	0.218	8	D	3.14	4	B	41
T103	0.551	8	B	0.175	10	D	2.31	9	B	45
T149	0.487	10	B	0.387	1	C	2.84	5	B	20
T039	0.392	11	C	0.252	6	D	2.51	8	B	26
T022	0.733	3	A	0.291	4	D	4.00	1	A	40
T120	0.639	5	A	0.320	3	D	3.33	3	B	32
T015	0.771	2	A	0.232	7	D	2.24	11	B	46
T009	0.527	9	B	0.364	2	D	3.81	2	A	24
T095	0.392	11	C	0.258	5	D	2.61	7	B	25
T050	0.242	13	D	0.150	11	D	0.00	13	D	27
T058	0.709	4	A	0.203	9	D	2.70	6	B	47
T057	0.636	6	A	0.081	13	D	1.51	12	C	69
T080	0.779	1	A	0.111	12	D	2.26	10	B	66

TABLE 16

NDI TECHNICIAN PROFICIENCY SCORES

NDI TECHNIQUE: ULTRASONIC

A.F.COMMAND: ATC A.F.BASE: B4

TECH	P SCORE			M.P SCORE			C SCORE			FALSE
CODE	S	R	G	S	R	G	S	R	G	CALLS
T019	0.373	2	D	0.337	1	D	3.73	1	A	9
T030	0.406	1	C	0.335	2	D	3.52	2	B	19

TABLE 17

NDI TECHNICIAN PROFICIENCY SCORES

NDI TECHNIQUE: ULTRASONIC

A.F.COMMAND: ATC A.F.BASE: B5

TECH	P SCORE			M.P SCORE			C SCORE			FALSE
CODE	S	R	G	S	R	G	S	R	G	CALLS
T052	C.508	4	B	0.371	1	D	2.63	1	B	22
T078	C.333	7	D	0.280	2	D	2.47	3	B	18
T130	C.575	2	B	0.132	4	D	2.49	2	B	50
T114	C.517	3	B	0.078	6	D	1.75	4	C	61
T110	C.661	1	A	0.136	3	D	1.62	5	C	51
T045	C.363	6	D	0.095	5	D	0.49	6	C	48
T137	C.475	5	C	0.034	7	D	0.00	7	D	77

TABLE 18

NDI TECHNICIAN PROFICIENCY SCORES

NDI TECHNICLE: ULTRASONIC

A.F.COMMAND: ATC A.F.BASE: B6

TECH	P SCORE			M.P SCORE			C SCORE			FALSE
CODE	S	R	G	S	R	G	S	R	G	CALLS
T081	C.472	4	C	0.375	1	C	3.13	1	B	20
T107	C.749	1	A	0.226	3	D	3.04	2	B	46
T047	C.357	5	D	0.266	2	D	2.44	3	B	21
T146	C.525	2	B	0.133	5	D	1.49	4	C	49
T141	C.505	3	B	0.088	6	D	0.94	5	C	57
T036	C.342	6	D	0.152	4	D	0.00	6	D	35
T023	C.337	7	D	0.086	7	D	0.00	6	D	49

TABLE 19

NDI TECHNICIAN PROFICIENCY SCORES

NDI TECHNICLE: ULTRASONIC

A.F.COMMAND: MAC A.F.BASE: B7

TECH	P SCORE			M.P SCORE			C SCORE			FALSE
CODE	S	R	G	S	R	G	S	R	G	CALLS
T092	C.494	4	B	0.408	1	C	3.52	1	B	19
T074	C.789	1	A	0.263	3	D	2.92	2	B	44
T111	C.438	6	C	0.271	2	D	2.14	3	C	27
T051	C.512	2	B	0.191	5	D	0.99	4	C	41
T017	C.390	7	C	0.130	9	D	0.50	6	C	44
T091	C.454	5	C	0.202	4	D	0.89	5	C	35
T064	C.276	9	D	0.138	8	D	0.00	9	D	32
T132	C.507	3	B	0.089	10	D	0.14	7	D	57
T085	C.252	8	D	0.153	7	D	0.04	8	D	31
T106	C.249	10	D	0.160	6	D	0.00	9	D	26

TABLE 20

NDI TECHNICIAN PROFICIENCY SCORES

NDI TECHNICLE: ULTRASONIC

A.F.COMMAND: MAC A.F.BASE: B8

TECH	P SCORE			M.P SCORE			C SCORE			FALSE
CODE	S	R	G	S	R	G	S	R	G	CALLS
T065	C.621	3	A	0.350	1	D	4.30	1	A	30
T125	C.514	9	B	0.130	3	D	2.29	2	B	49
T099	C.726	1	A	0.098	5	D	2.20	3	B	67
T097	C.589	6	B	0.065	6	D	1.82	4	C	73
T014	C.675	2	A	0.064	7	D	1.47	5	C	74
T086	C.617	4	A	0.049	9	D	1.34	6	C	76
T088	C.533	8	B	0.017	12	D	1.24	7	C	97
T089	C.591	5	A	0.033	10	D	1.11	8	C	84
T025	C.431	12	C	0.150	2	D	0.84	9	C	43
T035	C.387	13	C	0.111	4	D	0.83	10	C	47
T040	C.511	10	B	0.020	11	D	0.37	11	D	94
T076	C.570	7	B	0.063	8	D	0.00	12	D	73
T083	C.467	11	C	0.011	13	D	0.00	12	D	98
T028	C.294	14	D	0.002	14	D	0.00	12	D	111

TABLE 21

NDI TECHNICIAN PROFICIENCY SCORES

NDI TECHNICLE: ULTRASONIC

A.F.COMMAND: SAC A.F.BASE: B9

TECH	P SCORE			M.P SCORE			C SCORE			FALSE
CODE	S	R	G	S	R	G	S	R	G	CALLS
T001	0.351	4	D	0.226	4	D	1.94	2	C	26
T044	0.379	3	C	0.262	2	D	1.84	3	C	24
T056	0.421	1	C	0.298	1	D	2.23	1	B	23
T104	0.308	5	D	0.203	5	D	1.75	4	C	25
T066	0.380	2	C	0.235	3	D	1.56	5	C	27

TABLE 22

NDI TECHNICIAN PROFICIENCY SCORES

NDI TECHNIQUE: ULTRASONIC

A.F.COMMAND: SAC A.F.BASE: 810

TECH	P SCORE			M.P SCORE			C SCORE			FALSE
CODE	S	R	G	S	R	G	S	R	G	CALLS
T007	0.513	1	B	0.240	2	D	2.44	1	B	33
T024	0.397	2	C	0.072	3	D	0.00	3	D	54
T055	0.349	3	D	0.294	1	D	1.86	2	C	18

TABLE 23

NDI TECHNICIAN PROFICIENCY SCORES

NDI TECHNICLE: ULTRASONIC

A.F.COMMAND: SAC A.F.BASE: 811

TECH	P SCORE			M.P SCORE			C SCORE			FALSE
CODE	S	R	G	S	R	G	S	R	G	CALLS
T002	0.435	1	C	0.069	1	D	0	1	D	59

TABLE 24

NDI TECHNICIAN PROFICIENCY SCORES

NDI TECHNIQUE: ULTRASONIC

A.F.COMMAND: SAC A.F.BASE: 812

TECH	P SCORE			M.P SCORE			C SCORE			FALSE
CODE	S	R	G	S	R	G	S	R	G	CALLS
T006	0.677	1	A	0.156	2	D	2.76	2	B	50
T067	0.089	6	D	0.080	5	D	0.35	4	D	9
T077	0.520	3	B	0.120	3	D	0.62	3	C	50
T102	0.256	5	D	0.090	4	D	0.00	5	D	43
T037	0.573	2	B	0.027	6	D	0.00	5	D	86
T053	0.510	4	B	0.405	1	C	3.69	1	A	20

TABLE 25

NDI TECHNICIAN PROFICIENCY SCORES

NDI TECHNIQUE: ULTRASONIC

A.F.COMMAND: SAC A.F.BASE: B13

TECH	P SCORE			M.P SCORE			C SCORE			FALSE
CODE	S	R	G	S	R	G	S	R	G	CALLS
T042	0.611	1	A	0.378	1	C	4.31	1	A	27
T072	0.588	2	B	0.247	2	D	3.03	2	B	39
T060	0.485	3	C	0.227	3	D	2.17	3	B	33
T034	0.399	5	C	0.199	4	D	1.13	4	C	32
T123	0.448	4	C	0.167	5	D	0.99	5	C	41

TABLE 26

NDI TECHNICIAN PROFICIENCY SCORES

NDI TECHNIQUE: ULTRASONIC

A.F.COMMAND: TAC A.F.BASE: B14

TECH	P SCORE			M.P SCORE			C SCORE			FALSE
CODE	S	R	G	S	R	G	S	R	G	CALLS
T084	0.479	3	C	0.224	3	D	2.17	1	B	33
T147	0.622	1	A	0.074	6	D	1.16	2	C	70
T143	0.529	2	B	0.227	2	D	0.74	3	C	37
T151	0.402	6	C	0.236	1	D	0.50	4	C	29
T032	0.420	5	C	0.080	5	D	0.21	5	D	52
T150	0.475	4	C	0.041	8	D	0.00	6	D	75
T008	0.165	8	D	0.069	7	D	0.00	6	D	39
T094	0.234	7	D	0.138	4	D	0.00	6	D	29

TABLE 27

NDI TECHNICIAN PROFICIENCY SCORES

NDI TECHNIQUE: ULTRASONIC

A.F.COMMAND: TAC A.F.BASE: B15

TECH	P SCORE			M.P SCORE			C SCORE			FALSE
CODE	S	R	G	S	R	G	S	R	G	CALLS
T096	0.667	1	A	0.651	1	A	7.36	1	A	3
T048	0.458	3	C	0.363	2	D	3.96	2	A	20
T127	0.321	5	D	0.168	4	D	1.22	3	C	31
T071	0.147	6	D	0.083	6	D	0.00	5	D	30
T136	0.511	2	B	0.146	5	D	0.29	4	D	47
T005	0.334	4	D	0.196	3	D	0.00	5	D	29

TABLE 28

NDI TECHNICIAN PROFICIENCY SCORES

NDI TECHNIQUE: ULTRASONIC

A.F.COMMAND:TAC A.F.BASE: B16

TECH	P SCORE			M.P SCORE			C SCORE			FALSE
CODE	S	R	G	S	R	G	S	R	G	CALLS
T131	C.299	2	D	0.287	1	D	4.51	1	A	5
T062	C.251	4	D	0.199	2	D	0.32	2	D	20
T082	C.333	1	D	0.069	5	D	0.00	3	D	51
T139	C.28C	3	D	0.111	4	D	0.00	3	D	40
T063	C.153	5	D	0.121	3	D	0.00	3	D	20

EDDY-CURRENT METHOD

TABLE 29

NDI TECHNICIAN PROFICIENCY SCORES

NDI TECHNIQUE: EDDY-CURRENT

A.F.COMMAND: ALC A.F.BASE: 81

TECH	P SCORE			M.P SCORE			C SCORE			FALSE
CODE	S	R	G	S	R	G	S	R	G	CALLS
T109	0.901	2	A	0.706	1	C	8.59	1	A	4
T140	0.782	3	B	0.666	2	C	7.66	2	A	3
T004	0.761	5	C	0.647	3	C	7.43	3	B	3
T073	0.781	4	B	0.443	5	D	6.82	4	B	9
T101	0.605	8	D	0.474	4	D	6.00	5	C	4
T128	0.906	1	A	0.162	7	D	5.56	6	C	31
T033	0.716	7	C	0.342	6	D	5.48	7	C	13
T116	0.426	13	D	0.089	10	D	1.83	11	D	29
T003	0.750	6	C	0.045	12	D	2.75	8	D	55
T115	0.583	9	D	0.100	9	D	2.38	9	D	32
T054	0.455	12	D	0.122	8	D	2.11	10	D	23
T129	0.571	10	D	0.072	11	D	1.62	12	D	38
T012	0.366	14	D	0.027	13	D	0.00	14	D	50
T112	0.550	11	D	0.012	14	D	1.07	13	D	94
T079	0.280	15	D	0.004	15	D	0.00	14	D	110

TABLE 30

NDI TECHNICIAN PROFICIENCY SCORES

NDI TECHNIQUE: EDDY-CURRENT

A.F.COMMAND: ALC A.F.BASE: 82

TECH	P SCORE			M.P SCORE			C SCORE			FALSE
CODE	S	R	G	S	R	G	S	R	G	CALLS
T010	0.661	20	C	0.518	13	D	6.50	17	B	4
T013	0.481	24	D	0.212	24	D	3.60	24	D	15
T020	0.727	17	C	0.287	21	D	4.96	23	C	17
T029	0.717	18	C	0.390	19	D	5.92	20	C	10
T122	0.649	21	C	0.509	14	D	6.50	17	B	4
T144	0.637	22	C	0.637	8	C	7.23	13	B	0
T148	0.922	4	A	0.213	23	D	5.82	21	C	28
T090	0.869	6	A	0.739	3	B	8.56	3	A	3
T100	0.836	12	B	0.730	4	B	8.54	4	A	2
T135	0.933	3	A	0.619	9	C	8.47	5	A	6
T046	0.847	10	B	0.721	5	B	8.34	6	A	3
T038	0.771	15	B	0.771	1	B	8.33	7	A	0
T011	0.861	8	A	0.469	15	D	7.38	12	B	10
T152	0.760	16	C	0.595	10	C	7.46	11	B	4
T142	0.940	1	A	0.463	16	D	7.57	9	A	12
T133	0.940	1	A	0.463	16	D	7.57	9	A	12
T061	0.693	19	C	0.543	12	D	6.99	15	B	4
T145	0.782	14	B	0.444	18	D	6.57	16	B	9
T134	0.637	22	C	0.594	11	C	7.19	14	B	1
T059	0.814	13	B	0.638	7	C	7.92	8	A	4
T043	0.901	5	A	0.706	6	C	8.59	2	A	4
T117	0.869	6	A	0.739	2	B	8.75	1	A	2
T121	0.857	9	B	0.230	22	D	5.80	22	C	23
T016	0.841	11	B	0.320	20	D	6.10	19	C	18

TABLE 31

NDI TECHNICIAN PROFICIENCY SCORES

NDI TECHNIQUE: EDDY-CURRENT

A.F.COMMAND: ANG A.F.BASE: 83

TECH	P SCORE			M.P SCORE			C SCORE			FALSE
CODE	S	R	G	S	R	G	S	R	G	CALLS
T103	0.869	3	A	0.739	1	B	8.56	1	A	3
T009	0.764	9	C	0.365	9	D	6.48	10	B	13
T105	0.847	5	B	0.721	2	B	8.34	2	A	3
T118	0.836	6	B	0.580	6	C	7.96	3	A	5
T039	0.692	11	C	0.692	3	C	7.90	4	A	0
T120	0.770	8	B	0.655	4	C	7.89	5	A	3
T068	0.591	14	D	0.591	5	C	7.23	6	B	0
T075	0.518	16	D	0.282	11	D	4.61	13	C	10
T022	0.936	1	A	0.37	8	D	6.95	7	B	17
T058	0.933	2	A	0.334	10	D	6.72	9	B	19
T057	0.737	10	C	0.446	7	D	6.74	8	B	8
T080	0.854	4	B	0.204	12	D	5.51	11	C	26
T027	0.564	15	D	0.177	13	D	3.16	14	D	21
T015	0.417	17	D	0.131	15	D	2.32	15	D	21
T095	0.800	7	B	0.167	14	D	4.72	12	C	29
T149	0.612	13	D	0.082	16	D	2.31	16	D	36
T050	0.665	12	C	0.045	17	D	1.76	17	D	54

TABLE 32

NDI TECHNICIAN PROFICIENCY SCORES

NDI TECHNIQUE: EDDY-CURRENT

A.F.COMMAND: ATC A.F.BASE: B4

TECH	P SCORE			M.P SCORE			C SCORE			FALSE
CODE	S	R	G	S	R	G	S	R	G	CALLS
T030	C.913	1	A	0.797	1	B	8.97	1	A	2
T019	C.613	4	D	0.256	2	D	4.29	4	C	16
T138	C.738	2	C	0.187	4	D	4.69	3	C	24
T126	C.672	3	C	0.241	3	D	4.72	2	C	19
T124	C.521	5	D	0.152	5	D	2.50	5	D	22

TABLE 33

NDI TECHNICIAN PROFICIENCY SCORES

NDI TECHNIQUE: EDDY-CURRENT

A.F.COMMAND: ATC A.F.BASE: 85

TECH	P SCORE			M.P SCORE			C SCORE			FALSE
CODE	S	R	G	S	R	G	S	R	G	CALLS
T052	0.907	1	A	0.902	1	A	9.59	1	A	1
T078	0.827	4	B	0.827	2	B	8.55	2	A	0
T11C	0.901	2	A	0.544	3	D	7.69	3	A	8
T13C	0.478	8	D	0.289	7	D	4.38	7	C	8
T114	0.858	3	A	0.538	4	D	7.61	4	A	7
T137	0.812	5	B	0.358	6	D	5.97	6	C	15
T045	0.794	6	B	0.527	5	D	7.08	5	B	0
T07C	0.765	7	B	0.063	8	D	3.11	8	D	46

TABLE 34

NDI TECHNICIAN PROFICIENCY SCORES

NDI TECHNIQUE: EDDY-CURRENT

A.F.COMMAND: ATC A.F.BASE: Bo

TECH	P SCORE			M.P SCORE			C SCORE			FALSE
CODE	S	R	G	S	R	G	S	R	G	CALLS
T047	0.760	2	C	0.709	1	C	7.88	1	A	1
T146	0.910	1	A	0.496	2	D	7.62	2	A	10
T023	0.738	3	C	0.490	3	D	6.84	3	B	6
T107	0.617	6	C	0.152	5	D	3.29	5	D	25
T036	0.586	7	D	0.210	4	D	3.39	4	D	19
T141	0.714	4	C	0.075	6	D	2.92	6	D	45
T081	0.655	5	C	0.034	7	D	1.15	7	D	59

TABLE 35

NDI TECHNICIAN PROFICIENCY SCORES

NDI TECHNIQUE: EDDY-CURRENT

A.F.COMMAND: MAC A.F.BASE: B7

TECH	P SCORE			M.P SCORE			C SCORE			FALSE
CODE	S	R	G	S	R	G	S	R	G	CALLS
T074	0.859	1	A	0.801	1	B	8.75	1	A	1
T091	0.793	4	B	0.550	4	D	7.50	2	B	5
T106	0.614	10	D	0.614	2	C	7.23	3	B	0
T092	0.638	9	C	0.595	3	C	6.96	4	B	1
T111	0.716	7	C	0.475	5	D	6.84	5	B	6
T051	0.727	6	C	0.456	6	D	6.66	6	B	7
T064	0.760	5	C	0.431	7	D	6.57	7	B	9
T132	0.814	3	B	0.413	8	D	6.51	8	B	11
T017	0.844	2	B	0.372	9	D	6.21	9	C	15
T085	0.666	8	C	0.114	10	D	3.17	10	D	32

TABLE 36

NDI TECHNICIAN PROFICIENCY SCORES

NDI TECHNIQUE: EDDY-CURRENT

A.F.COMMAND: MAC A.F.BASE: 88

TECH	P SCORE			M.P SCORE			C SCORE			FALSE
CODE	S	R	G	S	R	G	S	R	G	CALLS
T014	0.483	14	D	0.072	14	D	1.32	14	D	35
T097	0.997	1	A	0.692	2	C	9.08	1	A	5
T099	0.912	3	A	0.715	1	C	8.59	2	A	4
T125	0.880	5	A	0.610	4	C	8.19	3	A	5
T076	0.760	10	C	0.646	3	C	7.66	4	A	3
T040	0.828	7	B	0.396	6	D	6.72	5	B	13
T025	0.559	12	D	0.476	5	D	5.97	6	C	3
T065	0.840	6	B	0.276	9	D	5.87	7	C	20
T035	0.769	9	B	0.321	7	D	5.59	8	C	16
T086	0.700	11	C	0.313	8	D	5.34	10	C	14
T083	0.902	4	A	0.094	13	D	4.75	11	C	45
T088	0.943	2	A	0.113	12	D	5.36	9	C	40
T028	0.800	8	B	0.167	11	D	4.72	12	C	29
T089	0.521	13	D	0.198	10	D	2.94	13	D	18

TABLE 37

NDI TECHNICIAN PROFICIENCY SCORES

NDI TECHNIQUE: EDDY-CURRENT

A.F.COMMAND: SAC A.F.BASE: 810

TECH	P SCORE			M.P SCORE			C SCORE			FALSE
CODE	S	R	G	S	R	G	S	R	G	CALLS
T007	0.934	1	A	0.732	1	B	8.81	1	A	4
T055	0.553	2	D	0.516	2	D	6.72	2	B	1
T024	0.522	3	D	0.121	3	D	2.19	3	D	28

TABLE 38

NDI TECHNICIAN PROFICIENCY SCORES

NDI TECHNIQUE: EDDY-CURRENT

A.F.COMMAND: SAC A.F.BASE: Bil

TECH	P SCORE			M.P SCORE			C SCORE			FALSE
CODE	S	R	G	S	R	G	S	R	G	CALLS
T069	C.772	1	B	0.254	1	D	5.37	1	C	20
T119	C.559	2	D	0.129	2	D	2.46	2	D	28

TABLE 39

NDI TECHNICIAN PROFICIENCY SCORES

NDI TECHNIQUE: EDDY-CURRENT

A.F.COMMAND: SAC A.F.BASE: B12

TECH	P SCORE			M.P SCORE			C SCORE			FALSE
CODE	S	R	G	S	R	G	S	R	G	CALLS
T037	0.886	4	A	0.886	2	A	9.38	1	A	0
T067	0.902	3	A	0.902	1	A	9.38	1	A	0
T102	0.932	2	A	0.584	3	C	8.31	3	A	7
T006	0.953	1	A	0.341	4	D	6.96	4	B	19
T053	0.880	5	A	0.184	5	D	5.48	5	C	29

TABLE 40

NDI TECHNICIAN PROFICIENCY SCORES

NDI TECHNIQUE: EDDY-CURRENT

A.F.COMMAND: SAC A.F.BASE: 813

TECH	P SCORE			M.P SCORE			C SCORE			FALSE
CODE	S	R	G	S	R	G	S	R	G	CALLS
T042	0.965	1	A	0.641	1	C	8.69	1	A	6
T034	0.792	5	B	0.431	2	D	6.66	2	B	10
T072	0.807	4	B	0.386	3	D	6.48	3	B	13
T060	0.838	3	B	0.244	4	D	5.66	4	C	22
T123	0.875	2	A	0.091	5	D	4.48	5	C	45

TABLE 41

NDI TECHNICIAN PROFICIENCY SCORES

NDI TECHNIQUE: EDDY-CURRENT

A.F.COMMAND: TAC A.F.BASE: B14

TECH	P SCORE			M.P SCORE			C SCORE			FALSE
CODE	S	R	G	S	R	G	S	R	G	CALLS
T084	C.512	7	D	0.309	4	D	4.94	3	C	8
T032	C.801	1	B	0.335	2	D	5.84	2	C	16
T143	C.700	3	C	0.548	1	D	6.99	1	B	4
T094	C.517	6	D	0.312	3	D	4.38	4	C	8
T008	C.735	2	C	0.110	6	D	3.43	5	D	35
T151	C.548	4	D	0.160	5	D	3.06	6	D	22
T147	C.543	5	D	0.016	8	D	0.00	7	D	74
T150	C.476	8	D	0.018	7	D	0.00	7	D	65

TABLE 42

NDI TECHNICIAN PROFICIENCY SCORES

NDI TECHNIQUE: EDDY-CURRENT

A.F.COMMAND: TAC A.F.BASE: 815

TECH	P SCORE			M.P SCORE			C SCORE			FALSE
CODE	S	R	G	S	R	G	S	R	G	CALLS
T096	0.902	1	A	0.902	1	A	9.38	1	A	0
T048	0.826	3	B	0.771	2	B	8.53	2	A	1
T005	0.760	4	C	0.595	4	C	7.46	3	B	4
T071	0.693	5	C	0.647	3	C	7.42	4	B	1
T127	0.841	2	B	0.320	5	D	6.10	5	C	18
T136	0.560	6	D	0.138	6	D	3.02	6	D	25

TABLE 43

NDI TECHNICIAN PROFICIENCY SCORES

NDI TECHNIQUE: EDDY-CURRENT

A.F.COMMAND: TAC A.F.BASE: 816

TECH	P SCORE			M.P SCORE			C SCORE			FALSE
CODE	S	R	G	S	R	G	S	R	G	CALLS
T082	0.781	1	B	0.396	1	D	6.51	1	B	11
T131	0.771	2	B	0.242	2	D	5.26	2	C	21
T139	0.615	3	C	0.028	5	D	1.08	3	D	60
T062	0.457	4	D	0.055	4	D	0.60	5	D	40
T063	0.431	5	D	0.074	3	D	0.73	4	D	32

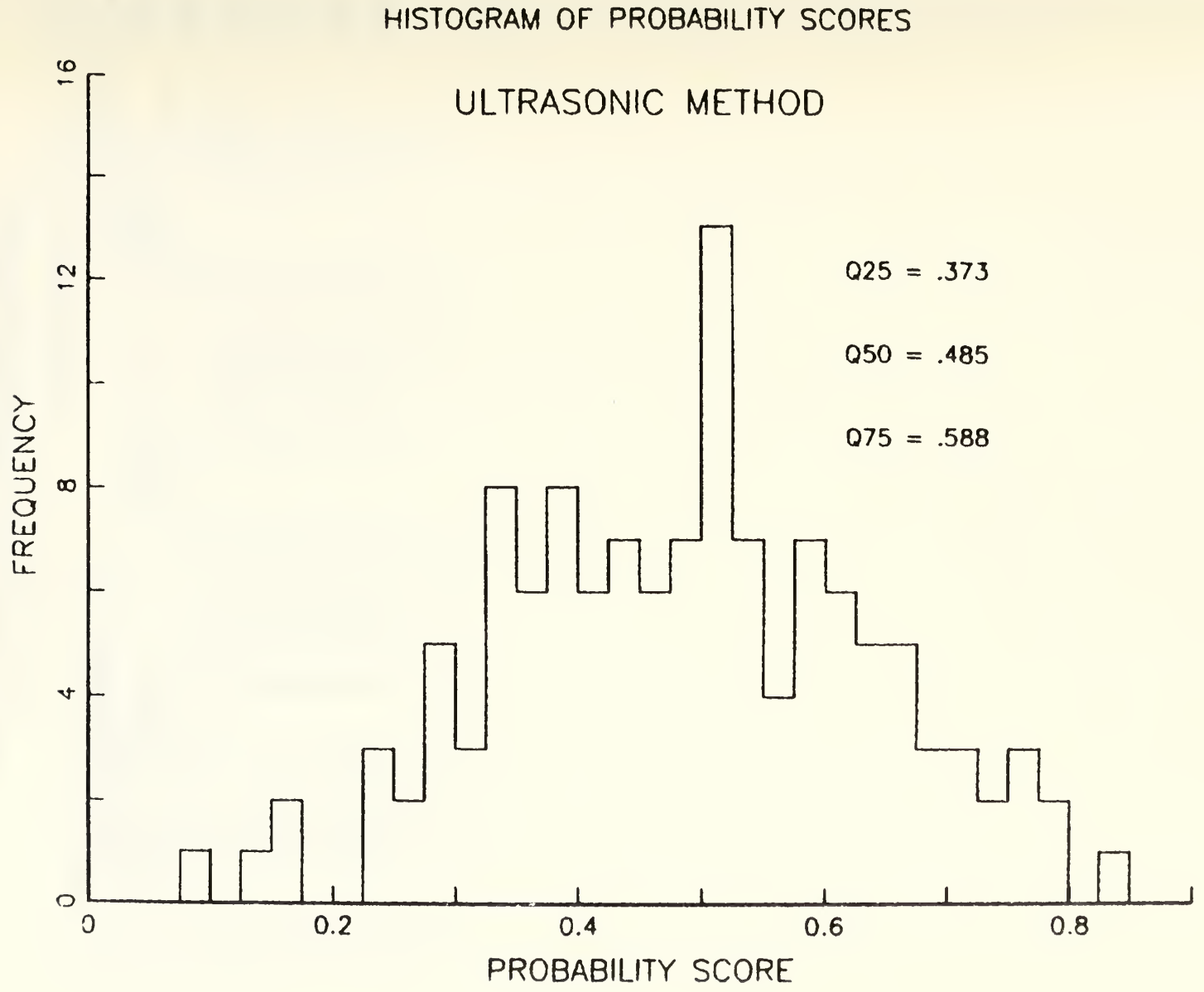
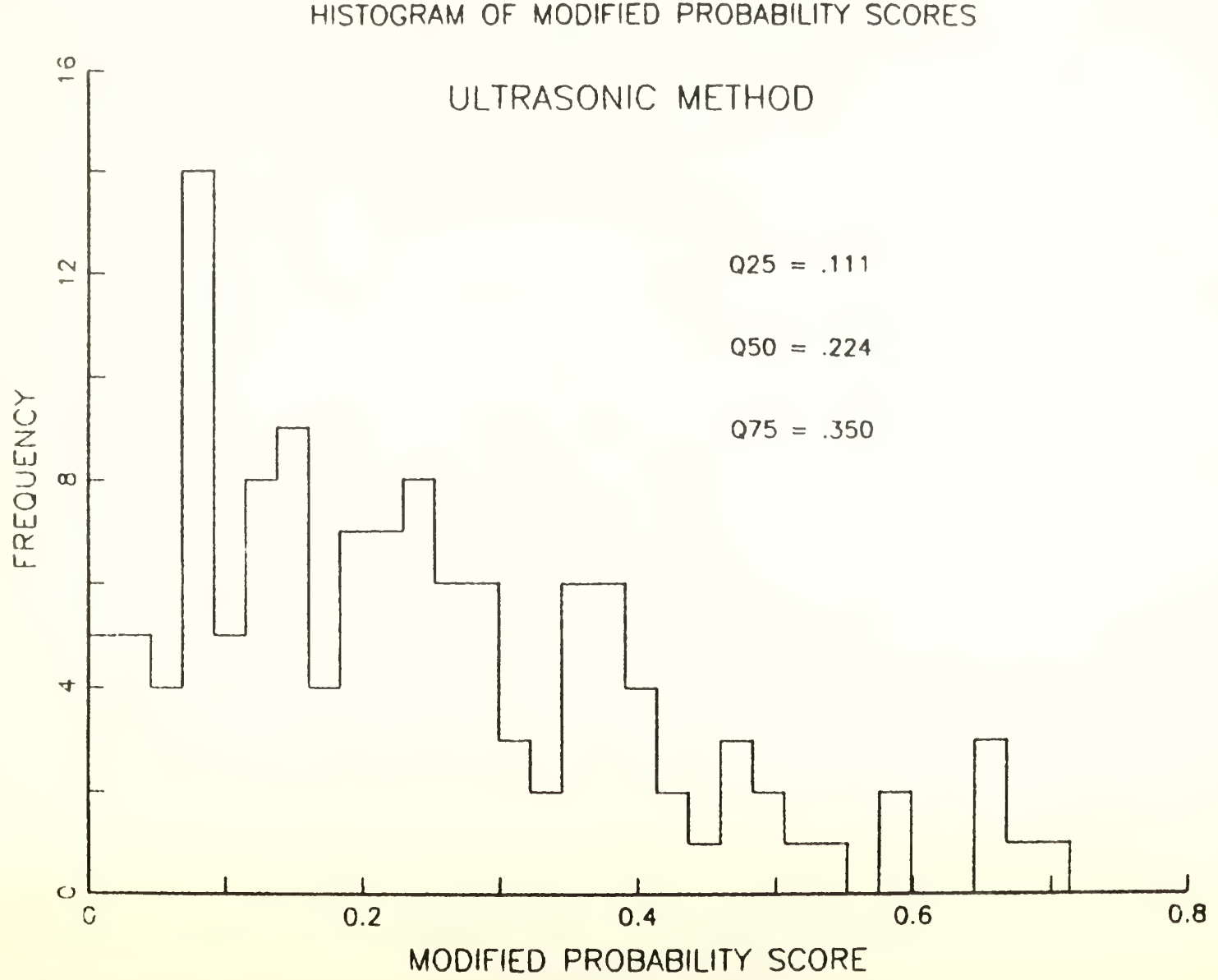

HISTOGRAM OF PROBABILITY SCORES
ULTRASONIC METHOD
Q25 = .373
Q50 = .485
Q075 = .588
FREQUENCY
0
4
8
12
16
0
0.2
0.4
0.6
0.8
PROBABILITY SCORE

Figure 1


HISTOGRAM OF MODIFIED PROBABILITY SCORES
ULTRASONIC METHOD
Q25 = .111
Q50 = .224
Q75 = .350
FREQUENCY
0
4
8
12
16
0
0.2
0.4
0.6
0.8
MODIFIED PROBABILITY SCORE

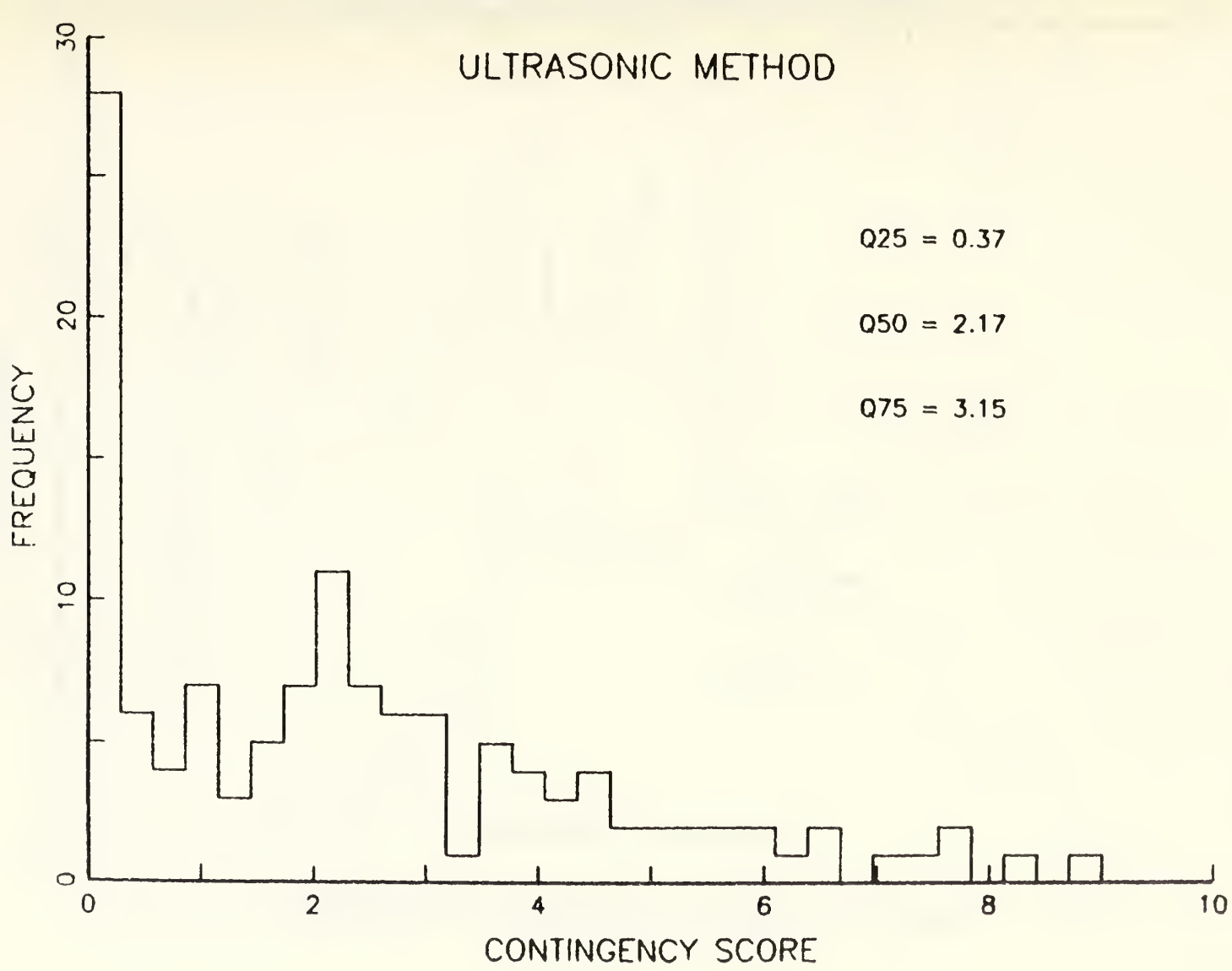
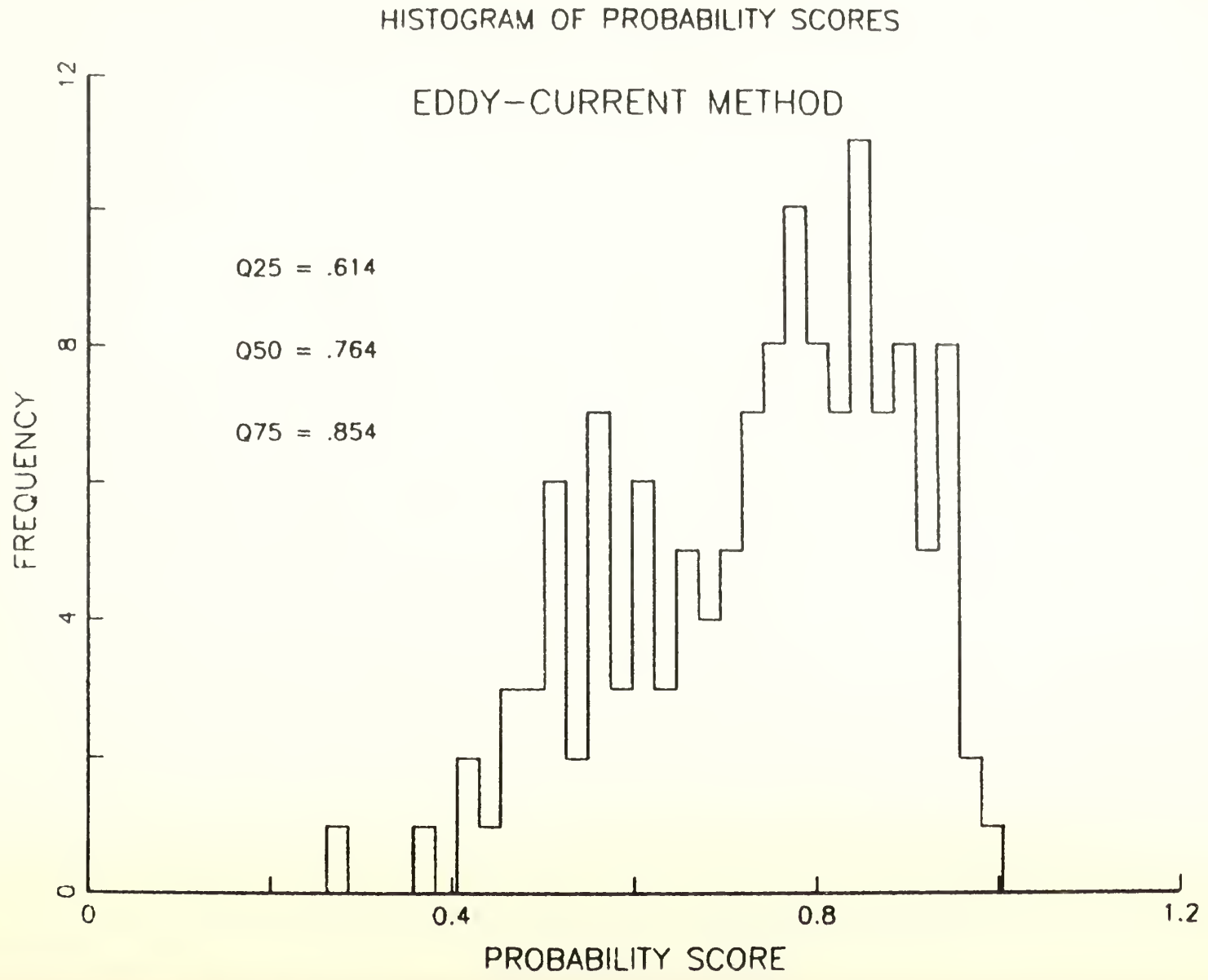

HISTOGRAM OF CONTINGENCY SCORES
ULTRASONIC METHOD
Q25 = 0.37
Q50 = 2.17
Q75 = 3.15
FREQUENCY
0
10
20
30
0
2
4
6
8
10
CONTINGENCY SCORE

Figure 3


HISTOGRAM OF PROBABILITY SCORES
EDDY-CURRENT METHOD
Q25 = .614
Q50 = .764
Q75 = .854
FREQUENCY
0
4
8
12
0
0.4
0.8
1.2
PROBABILITY SCORE

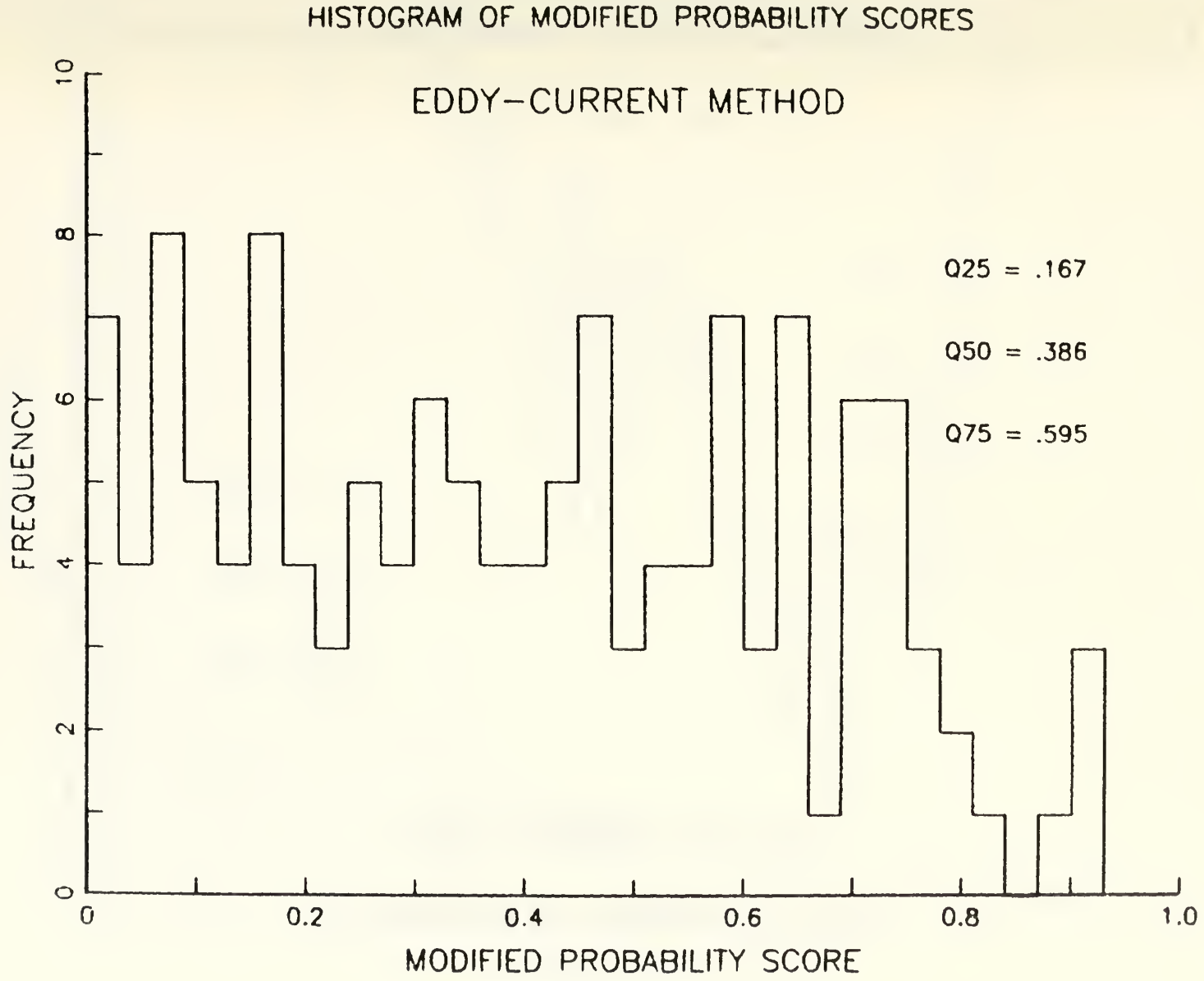
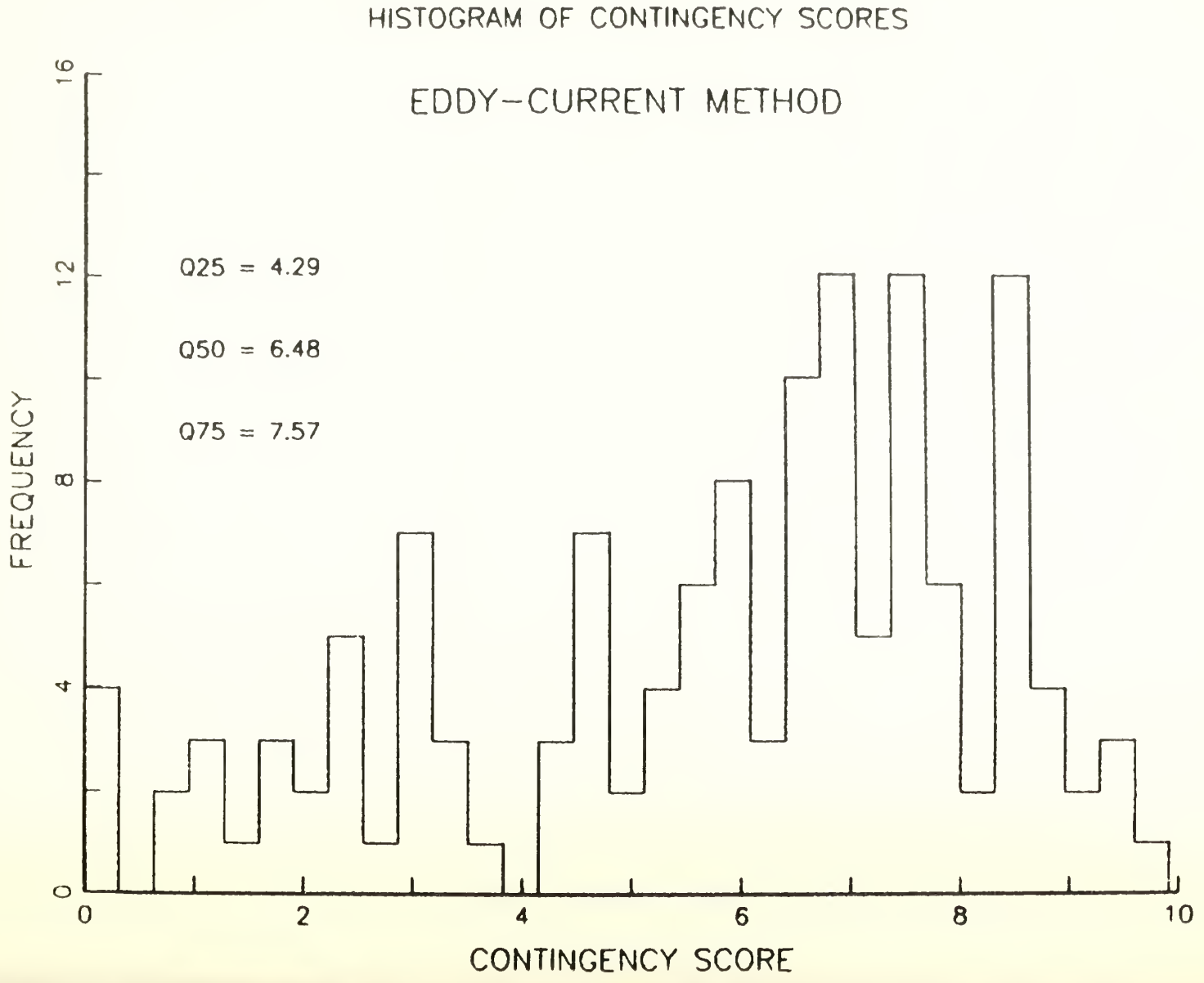

HISTOGRAM OF MODIFIED PROBABILITY SCORES
EDDY-CURRENT METHOD
Q25 = .167
Q50 = .386
Q75 = .595
FREQUENCY
0
2
4
6
8
10
0
0.2
0.4
0.6
0.8
1.0
MODIFIED PROBABILITY SCORE

Figure 5


HISTOGRAM OF CONTINGENCY SCORES
EDDY-CURRENT METHOD
Q25 = 4.29
Q50 = 6.48
Q75 = 7.57
FREQUENCY
0
4
8
12
16
0
2
4
6
8
10
CONTINGENCY SCORE

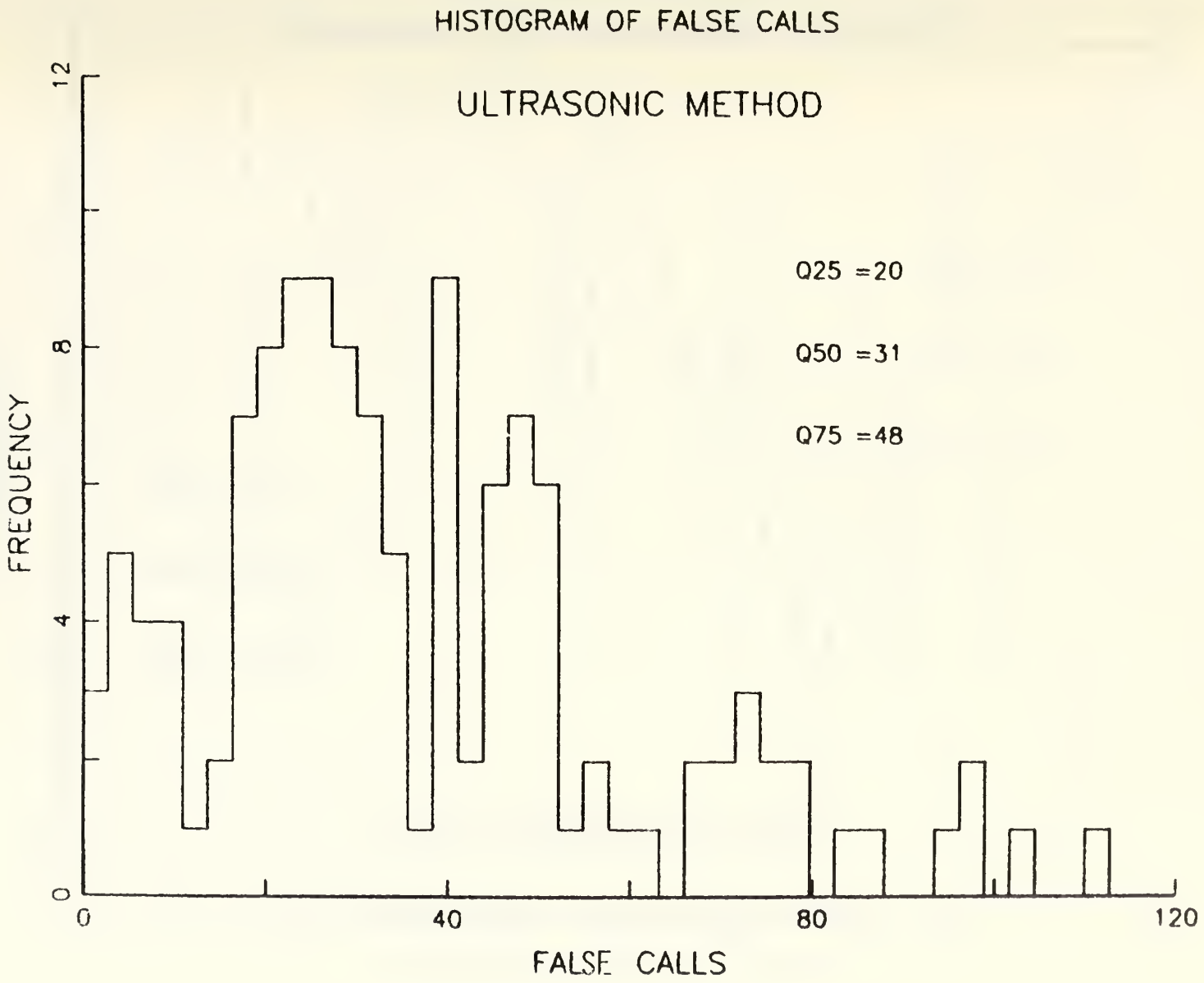
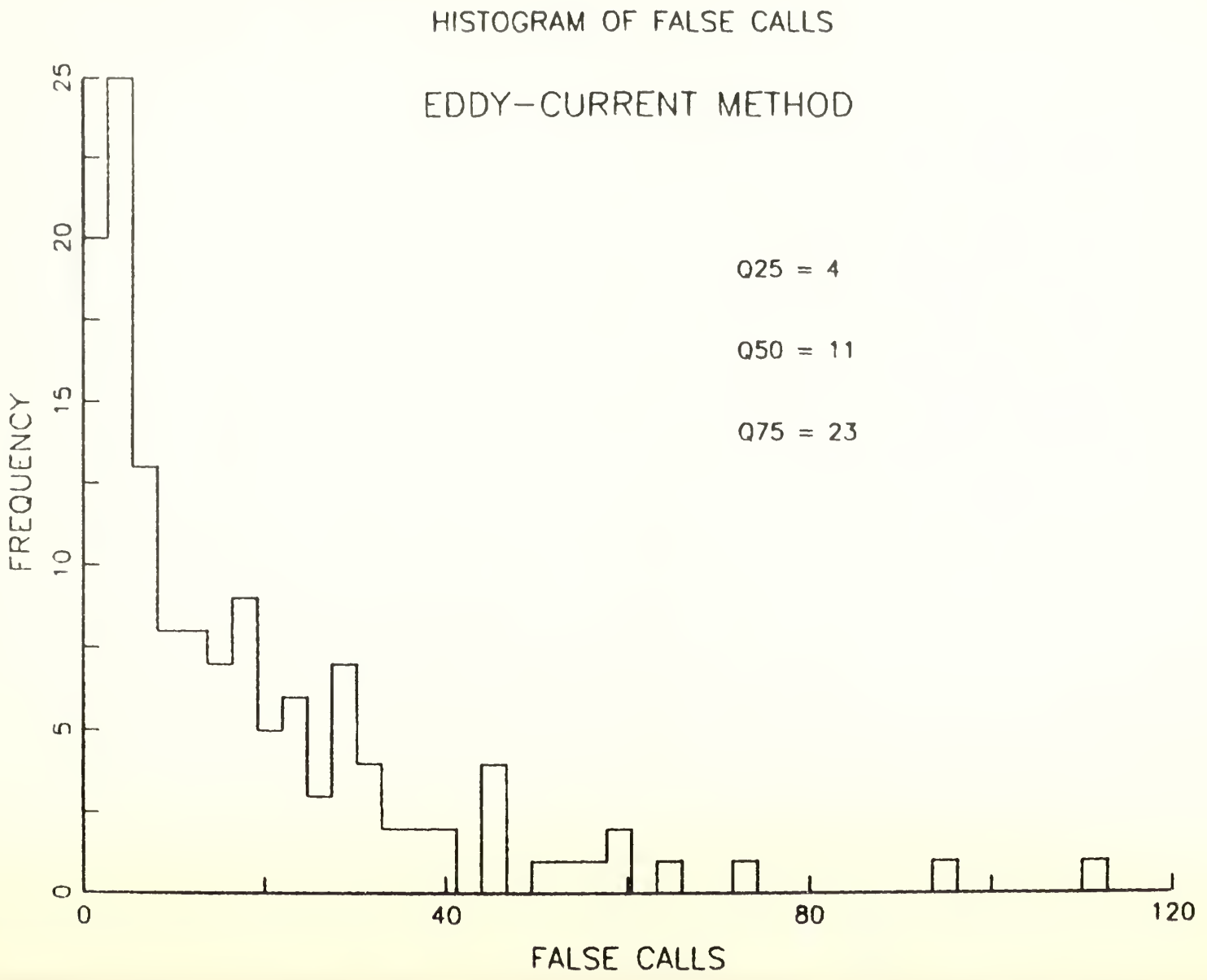

HISTOGRAM OF FALSE CALLS
ULTRASONIC METHOD
Q25 =20
Q50 =31
Q75 =48
FREQUENCY
0
4
8
12
0
40
80
120
FALSE CALLS

Figure 7


HISTOGRAM OF FALSE CALLS
EDDY-CURRENT METHOD
Q25 = 4
Q50 = 11
Q75 = 23
FREQUENCY
0
5
10
15
20
25
0
40
80
120
FALSE CALLS

APPENDIX I

THE VISUAL SIZE OF EVERY CRACK WAS MEASURED UNDER A MICROSCOPE, GIVING A TOTAL OF 19 DIFFERENT APPARENT SIZES. THESE WERE THEN MORE CRUDELY COLLAPSED INTO FOUR GROUPS, LABELLED (BY US) SMALL, MEDIUM, LARGE AND EXTRALARGE. THE ATTACHED TABLES GIVE COUNTS BY COMMAND AND FOR THE AIR FORCE IN TOTAL OF THE NUMBER OF OPPORTUNITIES (LABELLED OPPS) FOR EACH OF THE APPARENT SIZES, AS WELL AS THE NUMBER OF HITS AND THE PROPORTION OF HITS. THESE ARE TOTALS OVER ALL TECHNICIANS AND OVER THE THREE DIFFER-TYPES OF PLATES.

ULTRASONIC BY COMMAND

COMMAND 1

SIZE	HITS	OPPS	PROP
.03	0	0	
.04	24	102	.235
.05	9	34	.265
.06	13	34	.382
.09	93	133	.699
.10	116	193	.601
.11	3	14	.214
.15	27	34	.794
.16	180	238	.756
.17	60	68	.882
.18	0	0	
.19	0	0	
.23	0	0	
.24	13	16	.813
.25	60	68	.882
.26	15	16	.938
.27	57	70	.814
.28	0	0	
.30	0	0	

COMMAND 2

SIZE	HITS	OPPS	PROP
.03	4	7	.571
.04	19	45	.422
.05	0	0	
.06	19	31	.613
.09	51	86	.593
.10	10	20	.500
.11	4	6	.667
.15	34	52	.654
.16	45	65	.692
.17	12	13	.923
.18	0	0	
.19	0	0	
.23	0	0	
.24	15	19	.789
.25	12	13	.923
.26	8	13	.615
.27	4	7	.571
.28	9	13	.692
.30	0	0	

COMMAND 3

SIZE	HITS	OPPS	PROP
.03	0	0	
.04	18	57	.316
.05	1	7	.143
.06	16	50	.320
.09	29	78	.372
.10	20	39	.513
.11	5	9	.556
.15	43	80	.537
.16	12	16	.750
.17	36	48	.750
.18	0	0	
.19	8	16	.500
.23	20	25	.800
.24	6	7	.857
.25	0	0	
.26	27	39	.692
.27	7	9	.778
.28	0	0	
.30	0	0	

COMMAND 4

SIZE	HITS	OPPS	PROP
.03	13	24	.542
.04	23	60	.383
.05	7	12	.583
.06	13	24	.542
.09	79	132	.598
.10	58	108	.537
.11	0	0	
.15	0	0	
.16	82	120	.683
.17	54	72	.750
.18	29	48	.604
.19	0	0	
.23	8	12	.667
.24	34	48	.708
.25	28	36	.778
.26	10	12	.833
.27	8	12	.667
.28	0	0	
.30	0	0	

COMMAND 5

SIZE	HITS	OPPS	PROP
.03	0	0	
.04	18	60	.300
.05	4	20	.200
.06	4	20	.200
.09	44	100	.440
.10	31	80	.387
.11	6	20	.300
.15	0	0	
.16	88	160	.550
.17	17	40	.425
.18	0	0	
.19	0	0	
.23	0	0	
.24	14	20	.700
.25	19	30	.633
.26	38	50	.760
.27	0	0	
.28	0	0	
.30	0	0	

COMMAND 6

SIZE	HITS	OPPS	PROP
.03	10	29	.345
.04	6	38	.158
.05	3	9	.333
.06	6	19	.316
.09	47	124	.379
.10	18	57	.316
.11	6	9	.667
.15	22	57	.386
.16	24	57	.421
.17	23	57	.404
.18	7	19	.368
.19	0	0	
.23	8	19	.421
.24	7	10	.700
.25	27	48	.563
.26	9	18	.500
.27	0	0	
.28	0	0	
.30	0	0	

EDDY CURRENT BY COMMAND

COMMAND 1

SIZE	HITS	OPPS	PROP
.03	73	156	.468
.04	118	195	.605
.05	10	39	.256
.08	53	60	.883
.09	125	156	.801
.10	121	174	.695
.11	33	39	.846
.15	0	0	
.16	123	137	.898
.17	91	97	.938
.18	0	0	
.19	0	0	
.23	0	0	
.24	37	39	.949
.25	90	99	.909
.26	18	18	1.00
.27	0	0	
.28	0	0	
.30	0	0	

COMMAND 2

SIZE	HITS	OPPS	PROP
.03	4	9	.444
.04	60	119	.504
.05	22	42	.524
.08	15	17	.882
.09	102	122	.836
.10	40	48	.833
.11	0	0	
.15	21	33	.636
.16	60	69	.870
.17	0	0	
.18	0	0	
.19	0	0	
.23	0	0	
.24	14	17	.824
.25	21	24	.875
.26	8	10	.800
.27	0	0	
.28	0	0	
.30	17	17	1.00

COMMAND 3

SIZE	HITS	OPPS	PROP
.03	6	9	.667
.04	73	133	.549
.05	41	58	.707
.08	36	60	.600
.09	64	80	.800
.10	33	60	.550
.11	11	20	.550
.15	41	48	.854
.16	19	20	.950
.17	49	52	.942
.18	0	0	
.19	0	0	
.23	0	0	
.24	8	8	1.00
.25	8	8	1.00
.26	29	32	.906
.27	11	12	.917
.28	0	0	
.30	16	20	.800

COMMAND 4

SIZE	HITS	OPPS	PROP
.03	34	70	.486
.04	89	170	.524
.05	0	0	
.08	41	48	.854
.09	65	96	.677
.10	91	108	.843
.11	6	12	.500
.15	11	13	.846
.16	81	83	.976
.17	46	48	.958
.18	0	0	
.19	0	0	
.23	0	0	
.24	0	0	
.25	57	60	.950
.26	36	36	1.00
.27	0	0	
.28	0	0	
.30	0	0	

COMMAND 5

SIZE	HITS	OPPS	PROP
.03	7	15	.467
.04	63	91	.692
.05	35	44	.795
.08	48	60	.800
.09	63	75	.840
.10	28	30	.933
.11	0	0	
.15	7	7	1.00
.16	49	53	.925
.17	27	30	.900
.18	0	0	
.19	0	0	
.23	0	0	
.24	31	38	.816
.25	7	7	1.00
.26	13	15	.867
.27	0	0	
.28	0	0	
.30	0	0	

COMMAND 6

SIZE	HITS	OPPS	PROP
.03	12	29	.414
.04	68	142	.479
.05	8	19	.421
.08	26	38	.684
.09	34	67	.507
.10	74	104	.712
.11	0	0	
.15	19	19	1.00
.16	54	67	.806
.17	23	28	.821
.18	0	0	
.19	0	0	
.23	0	0	
.24	25	29	.862
.25	7	10	.700
.26	28	37	.757
.27	0	0	
.28	0	0	
.30	0	0	

FOR THE AIR FORCE IN TOTAL

ULTRASONIC

SIZE	HITS	OPPS	PROP
.03	27	60	.450
.04	108	362	.298
.05	24	82	.293
.08	71	178	.399
.09	343	653	.525
.10	253	497	.509
.11	24	58	.414
.15	126	223	.565
.16	431	656	.657
.17	202	298	.678
.18	36	67	.537
.19	8	16	.500
.23	36	56	.643
.24	89	120	.742
.25	140	195	.749
.26	107	148	.723
.27	76	98	.776
.28	9	13	.692
.30	0	0	

EDDY CURRENT

SIZE	HITS	OPPS	PROP
.03	136	288	.472
.04	471	850	.554
.05	116	202	.574
.08	219	283	.774
.09	453	596	.760
.10	387	524	.739
.11	50	71	.704
.15	99	120	.825
.16	386	429	.900
.17	236	255	.925
.18	0	0	
.19	0	0	
.23	0	0	
.24	115	131	.878
.25	190	208	.913
.26	132	148	.892
.27	11	12	.917
.28	0	0	
.30	33	37	.892

THE VISUAL SIZE OF EVERY CRACK WAS MEASURED UNDER A MICROSCOPE, GIVING A TOTAL OF 19 DIFFERENT APPARENT SIZES. THE NUMBERS OF OPPORTUNITIES, FOR THESE DIFFERENT SIZES, AND THE TYPES OF PLATES THEY OCCURRED ON, WERE NOT IDENTICAL FOR THE SIX COMMANDS. THE FOLLOWING TABLE LISTS THE DIFFERENT APPARENT SIZES FOR THE VARIOUS FLAWS, BY TYPE OF PLATE, FOR THE SIX COMMANDS.

TYPE DATA A1 NAVAL POSTGRADUATE SCHOOL

ULTRASONIC

COMMAND 1

SIZE	CAPS HITS	CAPS OPPS	CAPS PROP	SPLICE HITS	SPLICE OPPS	SPLICE PROP	TEAR HITS	TEAR OPPS	TEAR PROP
.03	0	0		0	0		0	0	
.04	0	0		18	68	.265	6	34	.176
.05	9	34	.265	0	0		0	0	
.08	0	0		0	0		13	34	.382
.09	42	68	.618	51	65	.785	0	0	
.10	37	68	.544	62	91	.681	17	34	.500
.11	0	0		3	14	.214	0	0	
.15	27	34	.794	0	0		0	0	
.16	51	68	.750	109	136	.801	20	34	.588
.17	28	34	.824	32	34	.941	0	0	
.18	0	0		0	0		0	0	
.19	0	0		0	0		0	0	
.23	0	0		0	0		0	0	
.24	0	0		13	16	.813	0	0	
.25	30	34	.882	30	34	.882	0	0	
.26	0	0		15	16	.938	0	0	
.27	25	34	.735	32	36	.889	0	0	
.28	0	0		0	0		0	0	

COMMAND 2

SIZE	CAPS HITS	CAPS OPPS	CAPS PROP	SPLICE HITS	SPLICE OPPS	SPLICE PROP	TEAR HITS	TEAR OPPS	TEAR PROP
.03	0	0		4	7	.571	0	0	
.04	6	13	.462	5	19	.263	8	13	.615
.05	0	0		0	0		0	0	
.08	10	13	.769	9	18	.500	0	0	
.09	26	39	.667	8	21	.381	17	26	.654
.10	0	0		10	20	.500	0	0	
.11	0	0		4	6	.667	0	0	
.15	8	13	.615	26	39	.667	0	0	
.16	29	39	.744	16	26	.615	0	0	
.17	0	0		0	0		12	13	.923
.18	0	0		0	0		0	0	
.19	0	0		0	0		0	0	
.23	0	0		0	0		0	0	
.24	9	13	.692	6	6	1.000	0	0	
.25	0	0		12	13	.923	0	0	
.26	0	0		8	13	.615	0	0	
.27	0	0		4	7	.571	0	0	
.28	9	13	.692	0	0		0	0	

COMMAND 3

SIZE	CAPS HITS	CAPS OPPS	CAPS PROP	SPLICE HITS	SPLICE OPPS	SPLICE PROP	TEAR HITS	TEAR OPPS	TEAR PROP
.03	0	0		0	0		0	0	
.04	6	16	.375	9	25	.360	3	16	.188
.05	0	0		1	7	.143	0	0	
.08	6	16	.375	10	34	.294	0	0	
.09	9	32	.281	15	30	.500	5	16	.313
.10	8	16	.500	4	7	.571	8	16	.500
.11	0	0		5	9	.556	0	0	
.15	26	48	.542	17	32	.531	0	0	
.16	0	0		12	16	.750	0	0	
.17	0	0		28	32	.875	8	16	.500
.18	0	0		0	0		0	0	
.19	8	16	.500	0	0		0	0	
.23	0	0		20	25	.800	0	0	
.24	0	0		6	7	.857	0	0	
.25	0	0		0	0		0	0	
.26	22	32	.688	5	7	.714	0	0	
.27	0	0		7	9	.778	0	0	
.28	0	0		0	0		0	0	

FILE: TYPE DATA A1 NAVAL POSTGRADUATE SCHOOL

ULTRASONIC
COMMAND 4

SIZE	CAPS HITS	CAPS OPPS	CAPS PROP	SPLICE HITS	SPLICE OPPS	SPLICE PROP	TEAR HITS	TEAR OPPS	TEAR PROP
.03	0	0		13	24	.542	0	0	
.04	10	24	.417	9	12	.750	4	24	.167
.05	0	0		7	12	.583	0	0	
.08	0	0		13	24	.542	0	0	
.09	18	24	.750	43	60	.717	18	48	.375
.10	34	72	.472	24	36	.667	0	0	
.11	0	0		0	0		0	0	
.15	0	0		0	0		0	0	
.16	31	48	.646	35	48	.729	16	24	.667
.17	0	0		54	72	.750	0	0	
.18	29	48	.604	0	0		0	0	
.19	0	0		0	0		0	0	
.23	0	0		8	12	.667	0	0	
.24	16	24	.667	18	24	.750	0	0	
.25	17	24	.708	11	12	.917	0	0	
.26	0	0		10	12	.833	0	0	
.27	0	0		8	12	.667	0	0	
.28	0	0		0	0		0	0	

COMMAND 5

SIZE	CAPS HITS	CAPS OPPS	CAPS PROP	SPLICE HITS	SPLICE OPPS	SPLICE PROP	TEAR HITS	TEAR OPPS	TEAR PROP
.03	0	0		0	0		0	0	
.04	0	0		18	40	.450	0	20	.000
.05	4	20	.200	0	0		0	0	
.08	0	0		4	20	.200	0	0	
.09	12	20	.600	21	40	.525	11	40	.275
.10	15	40	.375	16	40	.400	0	0	
.11	6	20	.300	0	0		0	0	
.15	0	0		0	0		0	0	
.16	31	60	.517	52	80	.650	5	20	.250
.17	9	20	.450	8	20	.400	0	0	
.18	0	0		0	0		0	0	
.19	0	0		0	0		0	0	
.23	0	0		0	0		0	0	
.24	0	0		14	20	.700	0	0	
.25	9	20	.450	10	10	1.000	0	0	
.26	16	20	.800	22	30	.733	0	0	
.27	0	0		0	0		0	0	
.28	0	0		0	0		0	0	

COMMAND 6

SIZE	CAPS HITS	CAPS OPPS	CAPS PROP	SPLICE HITS	SPLICE OPPS	SPLICE PROP	TEAR HITS	TEAR OPPS	TEAR PROP
.03	0	0		10	29	.345	0	0	
.04	3	19	.158	0	0		3	19	.158
.05	0	0		3	9	.333	0	0	
.08	0	0		6	19	.316	0	0	
.09	22	57	.386	21	48	.438	4	19	.211
.10	4	19	.211	7	19	.368	7	19	.368
.11	0	0		6	9	.667	0	0	
.15	15	38	.395	7	19	.368	0	0	
.16	8	19	.421	16	38	.421	0	0	
.17	0	0		15	38	.395	8	19	.421
.18	7	19	.368	0	0		0	0	
.19	0	0		0	0		0	0	
.23	8	19	.421	0	0		0	0	
.24	0	0		7	10	.700	0	0	
.25	8	19	.421	19	29	.655	0	0	
.26	0	0		9	18	.500	0	0	
.27	0	0		0	0		0	0	
.28	0	0		0	0		0	0	

TYPE DATA A1 NAVAL POSTGRADUATE SCHOOL

ULTRASONIC
AIR FORCE TOTAL

SIZE	CAPS HITS	CAPS OPPS	CAPS PROP	SPLICE HITS	SPLICE OPPS	SPLICE PROP	TEAR HITS	TEAR OPPS	TEAR PROP
.03	0	0		27	60	.450	0	0	
.04	25	72	.347	59	164	.360	24	126	.190
.05	13	54	.241	11	28	.393	0	0	
.08	16	29	.552	42	115	.365	13	34	.382
.09	129	240	.537	159	264	.602	55	149	.369
.10	98	215	.456	123	213	.577	32	69	.464
.11	6	20	.300	18	38	.474	0	0	
.15	76	133	.571	50	90	.556	0	0	
.16	150	234	.641	240	344	.698	41	78	.526
.17	37	54	.685	137	196	.699	28	48	.583
.18	36	67	.537	0	0		0	0	
.19	8	16	.500	0	0		0	0	
.23	8	19	.421	28	37	.757	0	0	
.24	25	37	.676	64	83	.771	0	0	
.25	64	97	.660	82	98	.837	0	0	
.26	38	52	.731	69	96	.719	0	0	
.27	25	34	.735	51	64	.797	0	0	
.28	9	13	.692	0	0		0	0	

SIZE	CAPS	SPLICE	TEAR
SMALL	(38 / 126)=.302	(97 / 252)=.385	(24 / 126)=.190
MEDIUM	(249 / 504)=.494	(342 / 630)=.543	(100 / 252)=.397
LARGE	(307 / 504)=.609	(427 / 630)=.678	(69 / 126)=.548
XLARGE	(169 / 252)=.671	(294 / 378)=.778	NONE

EDDY CURRENT
COMMAND 1

SIZE	CAPS HITS	CAPS OPPS	CAPS PROP	SPLICE HITS	SPLICE OPPS	SPLICE PROP	TBAR HITS	TBAR OPPS	TBAR PROP
.03	73	156	.468	0	0		0	0	
.04	29	39	.744	52	78	.667	37	78	.474
.05	0	0		10	39	.256	0	0	
.08	35	39	.897	18	21	.857	0	0	
.09	35	39	.897	90	117	.769	0	0	
.10	54	78	.692	67	96	.698	0	0	
.11	0	0		0	0		33	39	.846
.15	0	0		0	0		0	0	
.16	36	39	.923	52	59	.881	35	39	.897
.17	0	0		91	97	.938	0	0	
.24	37	39	.949	0	0		0	0	
.25	0	0		90	99	.909	0	0	
.26	0	0		18	18	1.000	0	0	
.27	0	0		0	0		0	0	
.30	0	0		0	0		0	0	

COMMAND 2

SIZE	CAPS HITS	CAPS OPPS	CAPS PROP	SPLICE HITS	SPLICE OPPS	SPLICE PROP	TBAR HITS	TBAR OPPS	TBAR PROP
.03	0	0		4	9	.444	0	0	
.04	30	68	.441	10	17	.588	20	34	.588
.05	8	17	.471	14	25	.560	0	0	
.08	15	17	.882	0	0		0	0	
.09	45	51	.882	57	71	.803	0	0	
.10	0	0		27	31	.871	13	17	.765
.11	0	0		0	0		0	0	
.15	0	0		21	33	.636	0	0	
.16	17	17	1.000	29	35	.829	14	17	.824
.17	0	0		0	0		0	0	
.24	0	0		14	17	.824	0	0	
.25	0	0		21	24	.875	0	0	
.26	0	0		8	10	.800	0	0	
.27	0	0		0	0		0	0	
.30	17	17	1.000	0	0		0	0	

COMMAND 3

SIZE	CAPS HITS	CAPS OPPS	CAPS PROP	SPLICE HITS	SPLICE OPPS	SPLICE PROP	TBAR HITS	TBAR OPPS	TBAR PROP
.03	0	0		6	9	.667	0	0	
.04	58	100	.580	15	33	.455	0	0	
.05	0	0		15	18	.833	26	40	.650
.08	15	20	.750	21	40	.525	0	0	
.09	0	0		45	60	.750	19	20	.950
.10	16	40	.400	17	20	.850	0	0	
.11	11	20	.550	0	0		0	0	
.15	15	20	.750	26	28	.929	0	0	
.16	0	0		19	20	.950	0	0	
.17	0	0		30	32	.938	19	20	.950
.24	0	0		8	8	1.000	0	0	
.25	0	0		8	8	1.000	0	0	
.26	0	0		29	32	.906	0	0	
.27	0	0		11	12	.917	0	0	
.30	16	20	.800	0	0		0	0	

TYPE DATA A1 NAVAL POSTGRADUATE SCHOOL

EDDY CURRENT
COMMAND 4

SIZE	CAPS HITS	CAPS OPPS	CAPS PROP	SPLICE HITS	SPLICE OPPS	SPLICE PROP	TEAR HITS	TEAR OPPS	TEAR PROP
.03	18	48	.375	16	22	.727	0	0	
.04	35	72	.486	32	50	.640	22	48	.458
.05	0	0		0	0		0	0	
.08	17	24	.708	24	24	1.000	0	0	
.09	6	24	.250	36	48	.750	23	24	.958
.10	42	48	.875	49	60	.817	0	0	
.11	0	0		6	12	.500	0	0	
.15	0	0		11	13	.846	0	0	
.16	24	24	1.000	33	35	.943	24	24	1.000
.17	0	0		46	48	.958	0	0	
.24	0	0		0	0		0	0	
.25	0	0		57	60	.950	0	0	
.26	24	24	1.000	12	12	1.000	0	0	
.27	0	0		0	0		0	0	
.30	0	0		0	0		0	0	

COMMAND 5

SIZE	CAPS HITS	CAPS OPPS	CAPS PROP	SPLICE HITS	SPLICE OPPS	SPLICE PROP	TEAR HITS	TEAR OPPS	TEAR PROP
.03	7	15	.467	0	0		0	0	
.04	19	30	.633	29	31	.935	15	30	.500
.05	23	30	.767	12	14	.857	0	0	
.08	22	30	.733	26	30	.867	0	0	
.09	24	30	.800	25	30	.833	14	15	.933
.10	0	0		28	30	.933	0	0	
.11	0	0		0	0		0	0	
.15	0	0		7	7	1.000	0	0	
.16	0	0		49	53	.925	0	0	
.17	12	15	.800	0	0		15	15	1.000
.24	12	15	.800	19	23	.826	0	0	
.25	0	0		7	7	1.000	0	0	
.26	0	0		13	15	.867	0	0	
.27	0	0		0	0		0	0	
.30	0	0		0	0		0	0	

COMMAND 6

SIZE	CAPS HITS	CAPS OPPS	CAPS PROP	SPLICE HITS	SPLICE OPPS	SPLICE PROP	TEAR HITS	TEAR OPPS	TEAR PROP
.03	4	19	.211	8	10	.800	0	0	
.04	24	57	.421	28	47	.596	16	38	.421
.05	8	19	.421	0	0		0	0	
.08	14	19	.737	12	19	.632	0	0	
.09	7	19	.368	27	46	.563	0	0	
.10	25	38	.658	34	47	.723	15	19	.789
.11	0	0		0	0		0	0	
.15	0	0		19	19	1.000	0	0	
.16	16	19	.842	24	29	.828	14	19	.737
.17	0	0		23	28	.821	0	0	
.24	0	0		25	29	.862	0	0	
.25	0	0		7	10	.700	0	0	
.26	14	19	.737	14	18	.778	0	0	
.27	0	0		0	0		0	0	
.30	0	0		0	0		0	0	

FILE: TYPE DATA A1 NAVAL POSTGRADUATE SCHOOL

EDDY CURRENT
AIR FORCE TOTAL

SIZE	CAPS HITS	CAPS OPPS	CAPS PROP	SPLICE HITS	SPLICE OPPS	SPLICE PROP	TEAR HITS	TEAR OPPS	TEAR PROP
.03	102	238	.429	34	50	.680	0	0	
.04	195	366	.533	166	256	.648	110	228	.482
.05	39	66	.591	51	96	.531	26	40	.650
.08	118	149	.792	101	134	.754	0	0	
.09	117	163	.718	280	374	.749	56	59	.949
.10	137	204	.672	222	284	.782	28	36	.778
.11	11	20	.550	6	12	.500	33	39	.846
.15	15	20	.750	84	100	.840	0	0	
.16	93	99	.939	206	231	.892	87	99	.879
.17	12	15	.800	190	205	.927	34	35	.971
.24	49	54	.907	66	77	.857	0	0	
.25	0	0		190	208	.913	0	0	
.26	38	43	.884	94	105	.895	0	0	
.27	0	0		11	12	.917	0	0	
.30	33	37	.892	0	0		0	0	

SIZE	CAPS	SPLICE	TEAR
SMALL	(336 / 670)=.501	(251 / 402)=.624	(136 / 268)=.507
MEDIUM	(383 / 536)=.715	(609 / 804)=.757	(117 / 134)=.873
LARGE	(120 / 134)=.896	(480 / 536)=.896	(121 / 134)=.903
XLARGE	(120 / 134)=.896	(361 / 402)=.898	NONE

LABEL DATA A1 NAVAL POSTGRADUATE SCHOOL

THE VISUAL SIZE OF EVERY CRACK WAS MEASURED UNDER A MICROSCOPE, GIVING A TOTAL OF 19 DIFFERENT APPARENT SIZES. THESE WERE THEN MORE CRUDELY COLLAPSED INTO FOUR GROUPS, LABELLED (BY US) SMALL, MEDIUM, LARGE AND EXTRALARGE. THE ATTACHED TABLES GIVE COUNTS BY COMMAND AND FOR THE AIR FORCE IN TOTAL OF THE NUMBER OF OPPORTUNITIES (LABELLED OPPS) FOR EACH OF THE APPARENT SIZES, AS WELL AS THE NUMBER OF HITS AND THE PROPORTION OF HITS. IN THIS SUMMARY, THE COUNTS ARE GIVEN FOR EACH OF THE THREE TYPES OF PLATES INDIVIDUALLY.

EDDY CURRENT

SIZE	CAPS C1	CAPS C2	CAPS C3	CAPS C4	CAPS C5	CAPS C6	SPLICE C1	SPLICE C2	SPLICE C3	SPLICE C4	SPLICE C5	SPLICE C6	TBAR C1	TBAR C2	TBAR C3	TBAR C4	TBAR C5	TBAR C6
.03	4	0	0	2	1	1	0	1	1	2	0	1	0	0	0	0	0	0
.04	1	4	5	3	2	1	4	2	3	4	4	5	2	2	0	2	2	2
.05	0	1	0	0	2	1	2	3	2	0	2	0	0	0	2	0	0	0
.06	1	1	1	1	2	1	2	3	2	2	1	2	0	0	0	0	0	0
.07	1	3	0	1	2	1	4	5	5	4	3	4	0	0	1	1	1	0
.10	2	0	2	2	0	2	4	4	2	3	4	4	0	1	0	0	0	1
.11	0	0	1	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0
.15	0	0	1	0	0	0	0	3	2	1	1	2	0	0	0	0	0	0
.16	1	1	0	1	0	1	2	3	2	2	5	2	1	1	0	1	0	1
.17	1	0	0	0	1	0	4	0	2	3	0	3	0	0	1	0	1	0
.24	1	0	0	0	1	0	0	2	1	0	0	0	0	0	0	0	0	0
.25	0	0	0	0	0	0	0	3	1	0	1	1	0	0	0	0	0	0
.26	0	0	0	1	0	1	1	1	3	1	2	2	0	0	0	0	0	0
.27	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
.30	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

ULTRASONIC

SIZE	CAPS C1	CAPS C2	CAPS C3	CAPS C4	CAPS C5	CAPS C6	SPLICE C1	SPLICE C2	SPLICE C3	SPLICE C4	SPLICE C5	SPLICE C6	TBAR C1	TBAR C2	TBAR C3	TBAR C4	TBAR C5	TBAR C6
.03	0	0	0	0	0	0	0	1	0	2	0	3	0	0	0	0	0	0
.04	0	1	1	1	0	1	4	3	3	1	4	0	1	1	1	1	1	1
.05	1	0	0	0	1	0	0	0	1	1	0	1	0	0	0	0	0	0
.06	0	1	1	0	0	0	0	3	1	2	2	2	0	0	0	0	0	0
.07	2	3	2	1	1	0	4	3	4	5	4	5	1	2	1	1	2	1
.10	2	0	1	3	2	1	5	3	1	3	4	2	1	0	1	2	1	1
.11	0	0	0	0	1	0	1	1	1	0	0	1	0	0	0	0	0	0
.15	1	1	3	0	0	2	0	3	2	0	0	1	0	0	0	0	0	0
.16	2	3	0	2	3	1	4	2	1	2	4	2	1	0	0	1	1	0
.17	1	0	0	0	1	0	1	0	2	3	1	2	0	1	0	0	0	0
.18	0	0	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0
.19	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
.23	0	0	0	0	0	0	0	0	3	1	0	0	0	0	0	0	0	0
.24	0	1	0	1	0	0	1	1	1	2	2	1	0	0	0	0	0	0
.25	1	0	0	1	1	1	2	2	0	1	1	3	0	0	0	0	0	0
.26	0	0	2	0	1	0	1	2	1	0	3	2	0	0	0	0	0	0
.27	1	0	0	0	0	0	2	1	1	1	0	0	0	0	0	0	0	0
.28	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

APPENDIX II

THE ATTACHED TABLES GIVE COUNTS OF THE NUMBER OF TECHNICIANS TO INSPECT EACH INDIVIDUAL HOLE, THE NUMBER OF THEM THAT MARKED THE HOLE AS BEING DEFECTIVE, AND AN INDICATION OF WHETHER THE HOLE WAS IN FACT FLAWED; IF IT WAS FLAWED, A CODE IS USED TO INDICATE THE FLAW SIZE. FOR EXAMPLE, THE FIRST TABLE FOR COMMAND 1 IS REPRODUCED BELOW:

TEAR NUMBER (SCALLOP)	NUMBER OF TECHNICIANS	HOLE NUMBER 1	2	3	4
7	34	6¬1	13¬2	6	5
8	34	9	18	17-2	14
9	34	4	6	20¬3	5

THE TBARS ARE THE SCALLOPED PLATES WITH ONLY 4 HOLES IN THEM. EACH COMMAND RECEIVED ONLY THREE TBARS FOR THE ULTRASONICS TEST AND THREE FOR THE EDDY CURRENT TESTS. EACH OF THESE WAS USED IN EVERY CONFIGURATION AND THUS EVERY TECHNICIAN (ALL 34 FOR THIS BASE) HAD THE OPPORTUNITY TO INSPECT EVERY ONE OF THEM. OF THE 34 TECHNICIANS TO INSPECT TEAR 7, 6 OF THEM MARKED HOLE NUMBER 1, 13 OF THEM MARKED HOLE NUMBER 2, 6 MARKED HOLE NUMBER 3, ETC. ALSO, FOR THIS TEAR, HOLE NUMBER 1 DID IN FACT HAVE A SMALL FLAW (INDICATED BY ¬1) AND HOLE NUMBER 2 HAD A MEDIUM FLAW (INDICATED BY -2) AND THE OTHER TWO HOLES WERE PRESUMABLY UNFLAWED. THE OTHER TYPES OF PLATES AND COMMANDS ARE TREATED IN THE SAME WAY. THE MARKING ¬3 MEANS A LARGE FLAW, WHILE ¬4 MEANS AN EXTRA LARGE FLAW.

COMMAND 1
ULTRASONIC

TBAR NUMBER (SCALLOP)	NUMBER OF TECHNICIANS	HOLE NUMBER 1	2	3	4
7	34	6¬1	13¬2	6	5
8	34	9	18	17¬2	14
9	34	4	6	20¬3	5

CAP NUMBER / NUMBER OF TECHNICIANS		1 34	2 34	3 34	4 34
	1	6	5	3	25¬4
H	2	4	4	2	6
O	3	18¬2	5	30¬4	4
L	4	4	6	2	4
E	5	26¬3	6	28¬3	4
	6	5	9¬1	2	5
	7	2	7	4	8
N	8	7	23¬3	6	6
U	9	6	5	1	4
M	10	2	19¬2	20¬2	3
B	11	4	4	3	22¬2
E	12	2	2	2	6
R	13	3	5	7	5
	14	27¬3	4	5	8

SPLICE PLATE	NO OF TECHS	HOLE 1	2	3	4	5	NUMBER 6	7	8	9	10
51	15	4	2	3¬1	3	3¬1	1	5	4	6	3
52	19	5	4	5¬1	4	5	7¬1	4	6	4	5
53	20	4	18¬2	20¬2	3	4	3	4	7	14¬2	3
54	14	2	3	2¬2	13¬2	5	2	2	3¬2	2	0
55	17	8	7	4	8	10¬2	6	5	7¬2	5	4
56	17	16¬2	13¬2	5	5	4	1	3	2	4	3
57	34	9	9	29¬3	10	4	4	4	21¬3	29¬3	8
58	34	7	32¬3	9	8	30¬3	4	5	7	8	8
59	18	3	2	18¬4	6	15¬4	8	14¬4	3	4	1
60	16	15¬4	4	13¬4	15¬4	3	1	3	2	1	3
61	20	1	7	6	12	5	5	3	5	6	4
62	15	3	2	0	6	6	4	2	3	0	0
63	17	6	1	5	7	6	2	3	4	4	1
64	16	2	2	1	6	5	8	5	4	5	2

COMMAND 1
EDDY CURRENT

TBAR NUMBER (SCALLOP)	NUMBER OF TECHNICIANS	HOLE NUMBER 1	2	3	4
20	39	21¬1	7	4	6
21	39	10¬1	4	5	35¬3
22	39	3	33¬2	4	4

CAP NUMBER / NUMBER OF TECHNICIANS		15	16	17	18
	1	24¬2	15¬1	3	2
	2	5	5	2	5
HOLE	3	2	6	30¬2	29¬1
	4	4	3	3	2
	5	2	5	1	4
	6	37¬4	4	6	7
	7	3	2	2	3
NUMBER	8	6¬1	23¬1	35¬2	6
	9	6	3	4	6
	10	5	5	4	36¬3
	11	4	2	5	5
	12	4	11	6	4
	13	3	4	8	4
	14	4	35¬2	29¬1	5

SPLICE PLATE	NO OF TECHS	HOLE NUMBER 1	2	3	4	5	6	7	8	9	10
30	19	6	14¬1	2	8¬1	3	5	4¬1	5	1	5
31	20	10	3	6¬1	14¬1	5	1	2	1	1	10¬1
32	19	3	4	5	31¬2	6	20¬2	3	28¬2	4	8
33	18	4	2	16¬2	4	16¬2	2	17¬2	3	4	3
34	21	6	4	18¬2	4	4	15¬2	6	14¬2	5	8
35	19	2	17¬3	2	3	6	19¬3	2	3	4	3
36	20	3	3	3	3	19¬3	3	1	1	3	19¬3
37	39	18	8	5	7	36¬3	7	10	4	6	33¬3
38	18	5	5	6	18¬4	8	18¬4	7	18¬4	5	7
39	21	19¬4	2	2	18¬4	5	17¬4	6	4	1	13
40	18	8	3	1	4	3	2	1	3	4	8
41	19	5	3	2	2	6	7	3	2	4	4
42	21	7	2	5	0	1	2	1	1	4	5
43	20	5	3	5	4	3	1	4	5	3	9

COMMAND 2
LITHASONIC

TBAR NUMBER (SCALLOP)	NUMBER OF TECHNICIANS	HOLE NUMBER 1	2	3	4
7	13	8¬1	10¬2	4	4
8	13	4	4	7¬2	2
9	13	1	5	12¬3	1

CAP NUMBER NUMBER OF TECHNICIANS		1 13	2 13	3 13	4 13
	1	2	7	3	9¬4
	2	4	4	4	5
HOLE	3	10¬2	6	9¬4	2
	4	2	5	5	0
	5	8¬3	1	10¬3	5
	6	4	6¬1	2	4
	7	3	5	2	0
NUMBER	8	0	8¬3	4	3
	9	2	5	7	2
	10	2	6¬2	12¬2	1
	11	4	1	3	8¬2
	12	2	8	1	2
	13	2	5	3	0
	14	11¬3	4	2	5

SPLICE PLATE	NO OF TECHS	HOLE NUMBER 1	2	3	4	5	6	7	8	9	10
51	7	4	4	4¬1	4	2¬1	1	2	5	4	3
52	6	3	5	2¬1	4	3	1¬1	1	6	2	2
53	7	3	4¬2	3¬2	2	3	4	4	2	6¬2	2
54	6	2	3	4¬2	2¬2	4	1	1	4¬2	5	3
55	7	1	2	3	4	3¬2	2	2	2¬2	4	1
56	6	3¬2	3¬2	4	3	5	3	4	0	3	3
57	13	4	8	8¬3	4	8	6	6	9¬3	8¬3	7
58	13	3	9¬3	3	1	8¬3	3	6	0	2	2
59	7	2	2	2¬4	1	6¬4	3	4¬4	0	2	1
60	6	6¬4	2	6¬4	6¬4	4	5	2	2	3	2
61	7	1	0	3	2	4	3	5	1	1	3
62	7	1	1	2	3	3	4	1	3	2	4
63	6	2	6	4	5	5	3	3	2	2	4
64	6	3	3	3	1	3	4	2	2	1	4

COMMAND 2
ECDY CURRENT

TBAR NUMBER (SCALLOP)	NUMBER OF TECHNICIANS	HOLE NUMBER 1	2	3	4
20	17	13¬1	3	0	2
21	17	7¬1	1	0	14¬3
22	17	1	13¬2	3	0

CAP NUMBER / NUMBER OF TECHNICIANS		15 17	16 17	17 17	18 17
	1	13¬2	8¬1	1	2
	2	6	2	1	4
HOLE	3	3	3	13¬2	8¬1
	4	2	1	2	3
	5	2	4	2	1
	6	17¬4	1	3	2
	7	1	2	1	2
NUMBER	8	6¬1	8¬1	16¬2	1
	9	5	3	1	1
	10	0	6	1	17¬3
	11	7	1	1	2
	12	1	6	1	1
	13	1	6	0	2
	14	5	16¬2	6¬1	2

SPLICE PLATE	NO OF TECHS	HOLE 1	2	3	4	5	6	NUMBER 7	8	9	10
30	5	1	5¬1	0	4¬1	1	1	5¬1	1	2	2
31	8	1	5¬1	5¬1	3	0	1	0	1	1	4¬1
32	17	1	0	2	15¬2	3	14¬2	4	13¬2	0	2
33	10	1	0	8¬2	3	8¬2	2	7¬2	3	2	4
34	7	2	1	7¬2	1	2	5¬2	0	7¬2	1	1
35	9	1	7¬3	0	0	3	9¬3	1	0	3	3
36	8	2	0	1	1	7¬3	1	0	0	0	7¬3
37	17	5	2	1	0	7¬3	4	1	2	2	13¬3
38	10	0	2	2	8¬4	4	9¬4	5	8¬4	1	0
39	7	6¬4	0	1	6¬4	2	6¬4	4	1	0	2
40	10	1	0	3	4	1	1	2	1	1	3
41	9	1	3	3	1	1	1	0	2	2	1
42	8	0	0	0	0	0	2	0	0	0	0
43	7	3	0	0	0	1	1	0	0	3	2

COMMAND 3
ULTRASONIC

TBAR NUMBER (SCALLOP)	NUMBER OF TECHNICIANS	HOLE NUMBER 1	2	3	4
7	16	3¬1	5¬2	2	1
8	16	3	3	8¬2	3
9	16	4	2	8¬3	4

CAP NUMBER NUMBER OF TECHNICIANS		1 16	2 16	3 16	4 16
	1	2	3	5	9¬4
	2	7	6	5	6
HOLE	3	8¬2	4	13¬4	9
	4	5	3	5	5
	5	8¬3	5	8¬3	5
	6	4	6¬1	4	4
	7	6	6	7	4
NUMBER	8	5	10¬3	8	5
	9	4	5	6	5
	10	4	6¬2	8¬2	8
	11	2	4	4	1¬2
	12	7	3	5	1
	13	5	4	6	5
	14	8¬3	7	7	3

SPLICE PLATE	NO OF TECHS	HOLE NUMBER 1	2	3	4	5	6	7	8	9	10
51	9	3	2	2¬1	3	4¬1	3	4	5	3	6
52	7	4	4	1¬1	3	2	3¬1	3	2	3	4
53	9	2	4¬2	5¬2	6	2	1	5	4	4¬2	2
54	7	1	2	4¬2	3¬2	1	2	2	5¬2	1	2
55	9	4	4	4	2	3¬2	3	1	1¬2	4	5
56	7	4¬2	1¬2	4	4	3	2	2	3	2	2
57	16	8	5	15¬3	6	4	5	6	13¬3	7¬3	5
58	16	1	12¬3	5	2	10¬3	6	6	5	5	2
59	9	6	2	6¬4	4	7¬4	5	6¬4	4	5	4
60	7	6¬4	1	5¬4	6¬4	2	1	1	2	2	2
61	9	5	6	5	2	3	3	4	5	3	6
62	9	4	3	1	2	5	4	3	4	4	5
63	7	4	5	2	3	5	3	1	2	2	5
64	7	6	1	4	4	2	1	4	3	2	2

COMMAND 3
EDDY CURRENT

TBAR NUMBER (SCALLOP)	NUMBER OF TECHNICIANS	HOLE NUMBER 1	2	3	4
20	20	18¬1	1	1	3
21	20	8¬1	2	3	19¬3
22	20	1	19¬2	1	3

CAP NUMBER / NUMBER OF TECHNICIANS		15 20	16 20	17 20	18 20
HOLE NUMBER	1	15¬2	12¬1	8	4
	2	1	3	2	2
	3	6	8	11¬2	15¬1
	4	0	3	5	1
	5	3	5	3	2
	6	16¬4	4	5	3
	7	4	5	3	2
	8	3¬1	14¬1	6¬2	4
	9	2	5	2	1
	10	5	6	4	15¬3
	11	1	2	1	1
	12	1	1	3	1
	13	1	3	2	1
	14	3	10¬2	14¬1	3

SPLICE PLATE	NO OF TECHS	HOLE NUMBER 1	2	3	4	5	6	7	8	9	10
30	11	2	1¬1	0	6¬1	1	2	8¬1	1	0	1
31	9	4	1	7-1	6¬1	0	2	4	4	1	8¬1
32	20	3	3	6	12¬2	6	16¬2	5	9¬2	2	4
33	13	1	0	7¬2	4	11¬2	4	12¬2	0	0	2
34	7	1	2	6¬2	2	1	7¬2	3	3¬2	1	0
35	12	1	11¬3	6	2	3	11¬3	0	2	3	0
36	8	3	0	0	1	8¬3	3	3	0	2	6¬3
37	20	3	1	1	2	18¬3	3	1	3	4	19¬3
38	12	1	1	1	11¬4	1	11¬4	4	11¬4	1	0
39	8	7¬4	1	2	8¬4	2	8¬4	0	3	1	2
40	13	4	1	1	2	1	0	0	0	2	3
41	11	1	3	1	2	1	1	1	0	1	1
42	5	0	1	2	1	0	0	1	0	0	1
43	7	1	0	2	2	1	3	0	2	1	3

COMMAND 4
ULTRASONIC

TBAR NUMBER (SCALLOP)	NUMBER OF TECHNICIANS	HOLE NUMBER 1	2	3	4
7	24	4¬1	12¬2	9	9
8	24	10	13	6¬2	5
9	24	13	8	16¬3	4

CAP NUMBER NUMBER OF TECHNICIANS		1 24	2 24	3 24	4 24
	1	7	13	10	17¬4
H	2	10	12	9	10
O	3	13¬2	6	16¬4	14
L	4	7	6	10	5
E	5	17¬3	7	12¬3	13
	6	5	10¬1	8	15
	7	7	10	6	10
N	8	6	14¬3	9	13
U	9	7	8	10	7
M	10	9	12¬2	9¬2	4
B	11	8	8	12	18¬2
E	12	7	12	9	5
R	13	8	7	9	8
	14	17¬3	5	10	11

SPLICE PLATE	NO OF TECHS	HOLE NUMBER 1	2	3	4	5	6	7	8	9	10
51	12	5	5	4¬1	9	9¬1	7	6	9	9	7
52	12	7	8	7¬1	5	7	9¬1	7	9	5	6
53	12	7	9¬2	10¬2	9	6	7	9	6	11¬2	8
54	12	5	6	5¬2	7¬2	7	6	9	7¬2	3	5
55	12	9	10	6	9	9¬2	9	7	11¬2	9	8
56	12	8¬2	3¬2	6	7	6	8	5	8	9	8
57	24	10	15	16¬3	13	15	13	12	18¬3	20¬3	14
58	24	15	20¬3	9	18	15¬3	16	12	17	13	9
59	12	7	9	10¬4	10	11¬4	8	8¬4	8	7	7
60	12	10-4	7	6¬4	8¬4	5	8	7	6	8	5
61	12	4	7	8	10	7	7	10	7	6	8
62	12	6	7	8	10	10	8	9	8	9	7
63	13	6	9	8	7	7	6	9	8	7	5
64	11	5	5	7	4	7	5	6	3	4	4

COMMAND 4
EDDY CURRENT

TBAR NUMBER (SCALLOP)	NUMBER OF TECHNICIANS	HOLE NUMBER 1	2	3	4
20	24	12¬1	1	0	0
21	24	8¬1	2	1	24¬3
22	24	0	23¬2	1	2

CAP NUMBER / NUMBER OF TECHNICIANS		15	16	17	18
		24	24	24	24
HOLE NUMBER	1	17¬2	4¬1	5	3
	2	2	4	2	5
	3	3	3	21¬2	10¬1
	4	4	4	1	4
	5	5	2	2	5
	6	24-4	1	6	4
	7	2	7	5	0
	8	7-1	14¬1	6¬2	3
	9	3	2	3	1
	10	6	6	4	24¬3
	11	2	5	4	4
	12	2	3	4	4
	13	2	4	4	4
	14	8	21¬2	18¬1	4

SPLICE PLATE	NO OF TECHS	HOLE NUMBER 1	2	3	4	5	6	7	8	9	10
30	11	0	8¬1	0	8¬1	1	0	8¬1	0	0	0
31	13	1	1	8-1	8¬1	2	1	1	0	0	8-1
32	24	1	2	1	19¬2	0	20¬2	0	24¬2	0	2
33	12	0	0	6¬2	1	11¬2	1	5¬2	2	2	0
34	12	1	1	10¬2	1	0	12¬2	1	8¬2	2	1
35	11	1	9¬3	2	0	1	10¬3	2	2	1	0
36	13	1	1	4	1	11¬3	1	3	3	0	13-3
37	24	3	4	3	3	23¬3	2	3	1	1	24¬3
38	12	7	4	2	11¬4	4	12¬4	3	12¬4	2	3
39	12	10-4	1	0	12¬4	1	12¬4	1	1	3	3
40	12	0	4	2	2	4	1	3	2	0	0
41	11	0	0	0	1	3	0	1	2	1	7
42	12	0	0	3	1	0	1	3	0	0	3
43	13	2	1	1	2	1	2	2	1	2	1

COMMAND 5
ULTRASONIC

TBAR NUMBER (SCALLOP)	NUMBER OF TECHNICIANS	HOLE NUMBER 1	2	3	4
7	20	6¬1	4¬2	9	2
8	20	9	4	7¬2	6
9	20	2	8	5¬3	3

CAP NUMBER / NUMBER OF TECHNICIANS		1 20	2 20	3 20	4 20
	1	4	12	7	16¬4
	2	2	5	8	4
HOLE	3	6¬2	3	9¬4	3
	4	5	1	3	2
NUMBER	5	15¬3	4	9¬3	8
	6	4	4¬1	4	5
	7	5	8	2	5
	8	5	11¬3	7	7
	9	4	3	5	6
	10	7	5¬2	12¬2	5
	11	5	7	3	10¬2
	12	5	7	9	5
	13	5	4	7	3
	14	5¬3	4	2	9

SPLICE PLATE	NO OF TECHS	HOLE NUMBER 1	2	3	4	5	6	7	8	9	10
51	10	5	8	7¬1	5	3¬1	5	6	6	7	2
52	10	2	2	3¬1	8	3	5¬1	8	3	1	4
53	11	1	4¬2	5¬2	5	5	2	1	6	7¬2	5
54	9	2	6	8¬2	3¬2	5	5	5	5¬2	2	4
55	11	1	1	1	3	4¬2	7	3	4¬2	2	3
56	9	0¬2	1¬2	0	2	3	4	2	3	2	0
57	20	5	10	16¬3	13	6	10	7	15¬3	13¬3	4
58	20	4	8¬3	5	3	0¬3	10	4	5	5	10
59	10	3	2	6¬4	3	8¬4	2	10¬4	2	4	1
60	10	5¬4	1	1¬4	9¬4	7	6	6	5	3	2
61	11	2	1	5	5	7	5	6	3	0	7
62	10	3	1	2	2	3	2	3	2	4	2
63	10	3	2	1	1	3	3	2	3	3	4
64	9	4	4	2	2	6	2	3	4	6	3

COMMAND 5
EDDY CURRENT

TBAR NUMBER (SCALLOP)	NUMBER OF TECHNICIANS	HOLE NUMBER 1	2	3	4
20	15	13¬1	1	1	2
21	15	2¬1	2	2	15¬3
22	15	2	14¬2	1	0

CAP NUMBER / NUMBER OF TECHNICIANS		15	16	17	18
	1	11¬2	11¬1	2	2
	2	2	2	1	3
	3	3	5	12¬2	7¬1
	4	2	1	1	2
	5	1	3	0	3
	6	12¬4	0	3	2
	7	0	5	1	5
	8	9¬1	10¬1	11¬2	5
	9	1	2	2	1
	10	1	7	2	12¬3
	11	2	6	1	3
	12	1	2	2	4
	13	0	2	0	3
	14	4	12¬2	12¬1	7

SPLICE PLATE	NO OF TECHS	HOLE NUMBER 1	2	3	4	5	6	7	8	9	10
30	8	1	7¬1	0	8¬1	0	0	7¬1	0	0	0
31	7	0	0	5¬1	7¬1	1	1	1	1	1	7¬1
32	15	1	0	1	13¬2	3	12¬2	3	13¬2	4	2
33	8	1	3	6¬2	1	8¬2	1	8¬2	0	1	1
34	7	0	0	6¬2	0	2	5¬2	1	6¬2	2	0
35	8	3	8¬3	1	1	2	6¬3	1	3	0	2
36	7	2	0	0	0	7¬3	0	0	1	2	7¬3
37	15	2	0	1	2	14¬3	1	0	0	1	14¬3
38	8	0	1	1	7¬4	3	7¬4	0	6¬4	0	0
39	7	7¬4	1	1	7¬4	0	5¬4	1	0	2	1
40	8	0	1	2	0	3	0	0	0	0	0
41	6	0	1	0	2	3	0	1	1	0	4
42	7	1	1	1	4	2	0	1	1	2	2
43	7	0	0	1	0	1	1	1	2	1	5

COMMAND &
ULTRASONIC

TBAR NUMBER (SCALLOP)	NUMBER OF TECHNICIANS	HOLE NUMBER 1	2	3	4
7	19	3¬1	7-2	3	1
8	19	1	4	4¬2	6
9	19	2	5	8¬3	4

CAP NUMBER NUMBER OF TECHNICIANS		1 19	2 19	3 19	4 19
	1	6	9	4	8¬4
HOLE NUMBER	2	3	4	3	5
	3	6-2	1	8¬4	3
	4	2	6	4	7
	5	6-3	5	8¬3	4
	6	4	3¬1	0	6
	7	5	3	3	6
	8	4	7¬3	3	5
	9	3	4	7	3
	10	4	12¬2	4¬2	2
	11	3	3	4	4¬2
	12	4	2	2	5
	13	4	4	3	4
	14	7¬3	6	3	3

SPLICE PLATE	NO OF TECHS	HOLE NUMBER 1	2	3	4	5	6	7	8	9	10
51	10	6	4	3¬1	1	3¬1	6	2	3	4	4
52	9	3	4	4¬1	4	3	3¬1	5	1	2	5
53	10	3	3¬2	3¬2	4	3	2	3	2	5¬2	6
54	9	3	6	3¬2	6¬2	3	3	3	4¬2	3	3
55	10	4	4	3	2	7¬2	3	3	4¬2	3	5
56	9	4-2	1-2	4	4	4	3	5	2	3	4
57	19	4	8	10¬3	6	8	10	7	9¬3	7¬3	3
58	19	9	7¬3	8	7	5¬3	3	7	8	8	10
59	10	5	5	7-4	2	7¬4	5	8¬4	6	6	3
60	9	3-4	3	4-4	6¬4	3	4	3	2	2	4
61	10	6	5	2	4	4	5	3	2	6	4
62	10	2	5	2	4	5	6	3	4	6	1
63	9	2	3	1	3	2	2	3	2	1	3
64	9	4	4	4	4	3	3	4	4	2	2

COMMAND 6
EDDY CURRENT

TBAR NUMBER (SCALLOP)	NUMBER OF TECHNICIANS	HOLE NUMBER 1	2	3	4
20	19	11¬1	3	4	2
21	19	9¬1	2	4	14¬3
22	19	2	15¬2	5	2

CAP NUMBER / NUMBER OF TECHNICIANS		15 19	16 19	17 19	18 19
	1	9¬2	4¬1	7	4
HOLE NUMBER	2	1	1	1	3
	3	7	3	7¬2	9¬1
	4	2	5	8	1
	5	3	2	2	2
	6	14-4	1	0	6
	7	4	2	1	1
	8	8¬1	8¬1	10¬2	5
	9	5	2	3	3
	10	3	2	9	16¬3
	11	2	3	2	1
	12	0	1	1	1
	13	5	3	4	1
	14	1	14-2	7¬1	3

SPLICE PLATE	NO OF TECHS	HOLE NUMBER 1	2	3	4	5	6	7	8	9	10
30	10	2	8¬1	3	6¬1	1	2	7¬1	3	1	3
31	9	3	1	2¬1	7¬1	2	1	1	0	2	8¬1
32	19	1	8	6	16¬2	5	12¬2	7	10¬2	5	6
33	10	2	3	8¬2	2	7¬2	5	5¬2	4	4	3
34	9	1	2	4¬2	0	4	6¬2	1	5¬2	3	1
35	10	2	10¬3	2	2	3	10¬3	3	2	2	1
36	9	4	1	0	1	8¬3	3	0	2	1	9¬3
37	19	4	3	4	2	14¬3	8	3	4	7	15¬3
38	10	4	2	4	9¬4	5	10¬4	4	7¬4	4	4
39	9	7¬4	1	1	6¬4	2	7¬4	3	0	3	2
40	10	2	0	1	2	3	3	2	2	0	3
41	10	2	2	4	4	5	4	4	2	1	2
42	9	2	4	1	2	3	2	1	1	2	3
43	9	3	3	2	2	0	3	2	2	3	5

APPENDIX III

DESCRIPTION OF TI-59 PROGRAM TO COMPUTER PROBABILITY SCORES FOR NDI TECHNICIANS

To run the TI-59 program to compute the probability score for a technician or for all the technicians at a base/command using either the ultrasonic or the Eddy-Current technique, turn the calculator on, press |INV| |2nd| |WRITE|, feed the magnetic card right side up, press |2| |INV| |2nd| |WRITE|, feed the second side of the card and then follow the steps below:

STEP	ENTER	PRESS	
1	Total Number of Holes (inspection sites)/Rack	STO	01
2	Total Number of Small Flaws/Rack	STO	02
3	Total Number of Medium Flaws/Rack	STO	03
4	Total Number of Large Flaws/Rack	STO	04
5	Total Number of XLarge Flaws/Rack	STO	05
6	If The Score To Be Computed Is For One Technician Only Enter 1; Otherwise Enter The Total Number of Technicians At The Base/Command	STO	06
7		A	
8	Total Number of Small Flaws Detected	B	
9	Total Number of Medium Flaws Detected	C	
10	Total Number of Large Flaws Detected	D	
11	Total Number of XLarge Flaws Detected	E	
12	Total Number of False Calls	2nd	A
13	To Compute The Score For Ultrasonic	2nd	B
14	To Compute The Score For Eddy-Current	2nd	C

PROGRAM LISTING

```
LRN
2nd LBL
A               Store The Weights
.327            To Compute The Score
STO 07          For Ultrasonic
.210
STO 08
.166
STO 09
.143
STO
10
.154
STO 11
.287
STO 12
.201            Store The Weights
STO 13          For Eddy-Current
.168
STO 14
.167
STO 15
.177
STO 16
RCL 01
X
RCL 06
=               Compute The Total
STO 01          Number Of Flaws Of
RCL 02          Each Size Presented
X               To A Single Technician
RCL 06          Or All The Technicians
=               At A Base/Command As
STO 02          The Case May Be
RCL 03
X
RCL 06
STO 03
RCL 04
X
RCL 06
=
STO 04
RCL 05
X
RCL 06
=
STO 05
R|S
2nd LBL
B               Compute The Technicians'
STO 21          Probability Of
÷               Detecting Small Flaws
RCL 02
=
```

```
STO 31
R|S
2nd LBL
C
STO 22
÷
RCL 03
=
STO 32
R|S
2nd LBL
D
STO 23
÷
RCL 04
=
STO 33
R|S
2nd LBL
E
STO 24
÷
RCL 05
=
STO 34
R|S
2nd LBL
2nd A
STO 25
```

Compute The Probability Of Detecting Medium Flaws

Compute The Probability Of Detecting Large Flaws

Compute The Probability Of Detecting XLarge Flaws

Store The Number Of False Calls

```
+/-
-
RCL 02
-
RCL 03
-
RCL 04
-
RCL 05
+
RCL 01
=
STO 26
÷
(
RCL 25
+
RCL 26
)
=
STO 35
RCL 21
+
RCL 22
+
RCL 23
+
RCL 24
+
```

Compute The Number Of Unflawed Holes Correctly Identified

Compute The Probabilit
That An Unflawed Hole
Is Correctly Identifie

Compute The Probabilit
That A Hole Is Marked
As Flawed

```
RCL 25
=
÷
RCL 01
=
STO 36
R|S
2nd LBL
2nd B
(
1
-
RCL 36
)
X
(
(
RCL 31
X
RCL 07
)
+
(
RCL 32
X
RCL 08
)
+
(
RCL 33
X
RCL 09
)
+
(
RCL 34
X
RCL 10
)
)
=
+
(
RCL 36
X
RCL 35
X
RCL 11
)
=
÷
(
.846
-
(
.692
```

Compute The Weighted Average Of The Probabilities Of Detecting The Various Size Flaws And The Ultrasonic Weights Stored In Registers 07-10. Then Normalize The Weighted Average So That The Maximum Achievable Score Is 1. The Result Is The Probability Score For The Technician Or The Base/Command When Using The Ultrasonic Technique.

```
X
RCL 36
)
)
=
R|S
2nd LBL
2nd C
(
1
-
RCL 36
)
X
(
(
RCL 31
X
RCL 12
)
+
(
RCL 32
X
RCL 13
)
+
(
```

Compute The Probability Score For A Technician Or A Base/Command Using The Eddy-Current Technique.

```
RCL 33
X
RCL 14
)
+
(
RCL 34
X
RCL 15
)
)
=
+
(
RCL 36
X
RCL 35
X
RCL 16
)
=
÷
(
.823
-
(
.646
X
```

RCL 36

)

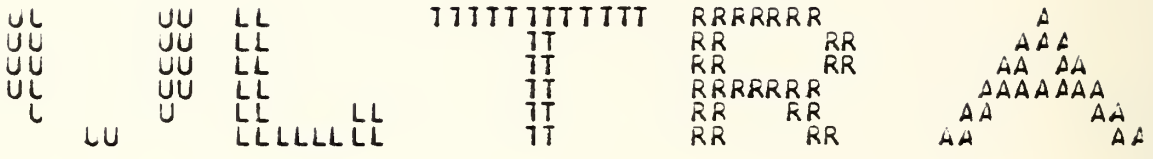
)

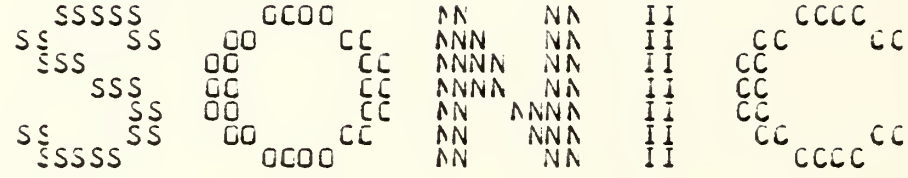
=

R|S

LRN

APPENDIX IV





THE ATTACHED PAGES LIST ALL THE TECHNICIANS WHO PARTICIPATED IN THE ULTRASONIC PROFICIENCY TEST, BY NAME, FOR EACH BASE. THE PERFORMANCE OF EACH TECHNICIAN IS DESCRIBED BY NUMBER OF HITS AND MISSES HE SCORED, FOR THE FOUR DIFFERENT FLAW SIZES AND FOR THE UNFLAWED HOLES (THE COLUMN MARKED NONE; IN THIS COLUMN A HIT MEANS HE DID NOT MARK THE SITE).

BASE1 DATA A1 NAVAL POSTGRADUATE SCHOOL

ULTRA SONIC

BASE 1

		SMALL	MEDIUM	LARGE	XLARGE	NONE
T113	HITS	1	9	10	5	117
	MISSES	3	2	0	0	1
T26	HITS	1	8	10	5	116
	MISSES	3	3	0	0	2
T18	HITS	0	8	9	5	116
	MISSES	4	3	1	0	2
T41	HITS	0	7	10	5	110
	MISSES	4	4	0	0	8
T87	HITS	0	10	9	5	101
	MISSES	4	1	1	0	17
T108	HITS	0	4	8	5	112
	MISSES	4	7	2	0	6
T109	HITS	2	10	9	5	94
	MISSES	2	1	1	0	24
T21	HITS	0	5	8	4	110
	MISSES	4	6	2	1	8
T98	HITS	1	5	8	5	103
	MISSES	3	6	2	0	15
T49	HITS	0	3	5	5	108
	MISSES	4	8	5	0	10
T73	HITS	1	6	8	5	94
	MISSES	3	5	2	2	24

BASE 2

		SMALL	MEDIUM	LARGE	XLARGE	NONE
T134	HITS	1	10	10	5	110
	MISSES	3	1	0	0	8
T144	HITS	1	10	10	4	108
	MISSES	3	1	0	1	10
T133	HITS	0	8	8	3	114
	MISSES	4	3	2	2	4
T43	HITS	3	9	9	5	99
	MISSES	1	2	1	0	19

ULTRA SONIC BASE 2

T3E		SMALL	MEDIUM	LARGE	XLARGE	NONE
	HITS	0	5	7	5	113
	MISSES	4	6	3	0	5

T31		SMALL	MEDIUM	LARGE	XLARGE	NONE
	HITS	2	8	8	5	99
	MISSES	2	3	2	0	19

T11		SMALL	MEDIUM	LARGE	XLARGE	NONE
	HITS	1	8	9	5	96
	MISSES	3	3	1	0	22

T61		SMALL	MEDIUM	LARGE	XLARGE	NONE
	HITS	0	5	4	5	113
	MISSES	4	6	6	0	5

T1C		SMALL	MEDIUM	LARGE	XLARGE	NONE
	HITS	1	8	9	4	95
	MISSES	3	3	1	1	23

T121		SMALL	MEDIUM	LARGE	XLARGE	NONE
	HITS	1	9	10	4	88
	MISSES	3	2	0	1	30

T9C		SMALL	MEDIUM	LARGE	XLARGE	NONE
	HITS	1	3	8	4	106
	MISSES	3	8	2	1	12

T2C		SMALL	MEDIUM	LARGE	XLARGE	NONE
	HITS	2	6	8	4	97
	MISSES	2	5	2	1	21

T117		SMALL	MEDIUM	LARGE	XLARGE	NONE
	HITS	2	8	8	5	87
	MISSES	2	3	2	0	31

T4E		SMALL	MEDIUM	LARGE	XLARGE	NONE
	HITS	1	8	10	3	73
	MISSES	3	3	0	2	45

T135		SMALL	MEDIUM	LARGE	XLARGE	NONE
	HITS	2	6	6	5	86
	MISSES	2	5	4	0	32

T93		SMALL	MEDIUM	LARGE	XLARGE	NONE
	HITS	1	6	6	5	79
	MISSES	3	5	4	0	39

T142		SMALL	MEDIUM	LARGE	XLARGE	NONE
	HITS	0	5	4	3	102
	MISSES	4	6	6	2	16

T145		SMALL	MEDIUM	LARGE	XLARGE	NONE
	HITS	0	4	6	3	96
	MISSES	4	7	4	2	22

T122		SMALL	MEDIUM	LARGE	XLARGE	NONE
	HITS	1	4	7	3	88
	MISSES	3	7	3	2	30

T152		SMALL	MEDIUM	LARGE	XLARGE	NONE
	HITS	2	2	6	4	88
	MISSES	2	9	4	1	30

ULTRA SONIC BASE 2

T29	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	0	8	7	4	40
MISSES	4	3	3	1	78

T148	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	1	3	5	1	78
MISSES	3	8	5	4	40

T13	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	4	7	8	4	15
MISSES	0	4	2	1	103

BASE 3

T1C5	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	1	9	9	3	77
MISSES	3	2	1	2	41

T1C3	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	1	6	9	4	75
MISSES	3	5	1	1	45

T149	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	2	4	6	2	98
MISSES	2	7	4	3	20

T39	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	0	6	5	4	92
MISSES	4	5	5	1	26

T22	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	2	10	8	5	76
MISSES	2	1	2	0	40

T120	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	2	5	8	5	86
MISSES	2	6	2	0	32

T15	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	4	7	4	5	72
MISSES	0	4	6	0	46

T9	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	1	6	9	3	94
MISSES	3	5	1	2	24

T95	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	0	6	5	4	95
MISSES	4	5	5	1	25

T5C	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	1	2	2	1	91
MISSES	3	9	8	4	27

T58	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	3	7	9	3	71
MISSES	1	4	1	2	47

ULTRA SONIC BASE 3

T57	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	2	9	7	5	49
MISSES	2	2	3	0	69

T8C	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	4	7	10	4	52
MISSES	0	4	0	1	66

BASE 4

T19	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	1	1	7	3	109
MISSES	3	10	3	2	9

T3C	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	0	5	7	4	99
MISSES	4	6	3	1	19

BASE 5

T52	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	2	2	6	4	96
MISSES	2	9	4	1	22

T7E	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	0	2	5	5	100
MISSES	4	9	5	0	18

T130	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	1	9	9	3	68
MISSES	3	2	1	2	50

T114	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	0	9	8	5	57
MISSES	4	2	2	0	61

T110	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	3	5	7	4	67
MISSES	1	6	3	1	51

T45	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	0	2	8	4	70
MISSES	4	9	2	1	48

T137	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	2	6	6	2	41
MISSES	2	5	4	3	77

BASE 6

T81	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	1	4	5	5	98
MISSES	3	7	5	0	20

ULTRA SONIC BASE 6

T107	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	3	6	9	5	72
MISSES	1	5	1	0	46

T47	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	0	3	5	5	97
MISSES	4	8	5	0	21

T146	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	1	6	6	5	69
MISSES	3	5	4	0	49

T141	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	1	6	7	4	61
MISSES	3	5	3	1	57

T36	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	2	3	1	1	83
MISSES	2	8	9	4	35

T23	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	2	1	3	1	69
MISSES	2	10	7	4	49

BASE 7

T92	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	1	5	5	5	99
MISSES	3	6	5	0	19

T74	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	4	5	9	4	74
MISSES	0	6	1	1	44

T111	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	1	3	6	4	91
MISSES	3	8	4	1	27

T51	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	2	4	4	4	77
MISSES	2	7	6	1	41

T17	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	1	6	5	1	74
MISSES	3	5	5	4	44

T91	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	2	5	3	2	83
MISSES	2	6	7	3	35

T64	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	1	4	3	0	86
MISSES	3	7	7	5	32

T132	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	2	5	5	3	61
MISSES	2	6	5	2	57

ULTRA SONIC BASE 7

T85	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	1	5	1	1	87
MISSES	3	6	9	4	31

T1C6	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	1	0	3	2	92
MISSES	3	11	7	3	26

BASE 8

T65	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	1	9	5	4	88
MISSES	3	2	1	1	30

T125	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	0	8	8	5	69
MISSES	4	3	2	0	49

T95	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	3	7	10	5	51
MISSES	1	4	0	0	67

T97	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	1	9	10	5	45
MISSES	3	2	0	0	73

T14	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	3	8	5	4	44
MISSES	1	3	1	1	74

T86	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	2	7	10	5	42
MISSES	2	4	0	0	76

T88	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	3	10	10	5	21
MISSES	1	1	0	0	97

T89	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	2	10	8	5	34
MISSES	2	1	2	0	84

T25	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	1	5	5	3	75
MISSES	3	6	5	2	43

T35	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	0	4	7	4	71
MISSES	4	7	3	1	47

T4C	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	2	8	10	5	24
MISSES	2	3	0	0	94

T76	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	3	5	6	3	45
MISSES	1	6	4	2	73

T83	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	2	8	9	5	20
MISSES	2	3	1	0	98

ULTRA SONIC

BASE 8

		SMALL	MEDIUM	LARGE	XLARGE	NONE
T2E	HITS	4	10	10	4	7
	MISSES	0	1	0	1	111

BASE 9

		SMALL	MEDIUM	LARGE	XLARGE	NONE
T1	HITS	0	5	4	4	92
	MISSES	4	6	6	1	26
T44	HITS	1	5	4	2	94
	MISSES	3	6	6	3	24
T56	HITS	1	4	4	4	95
	MISSES	3	7	6	1	23
T1C4	HITS	0	6	4	2	93
	MISSES	4	5	6	3	25
T66	HITS	1	5	4	2	91
	MISSES	3	6	6	3	27

BASE 10

		SMALL	MEDIUM	LARGE	XLARGE	NONE
T7	HITS	1	5	6	5	85
	MISSES	3	6	4	0	33
T24	HITS	2	4	3	1	64
	MISSES	2	7	7	4	54
T55	HITS	1	0	5	4	100
	MISSES	3	11	5	1	18

BASE 11

		SMALL	MEDIUM	LARGE	XLARGE	NONE
T2	HITS	2	2	6	2	59
	MISSES	2	9	4	3	59

BASE 12

		SMALL	MEDIUM	LARGE	XLARGE	NONE
T6	HITS	2	7	9	5	68
	MISSES	2	4	1	0	50

ULTRA SONIC BASE 12

T67	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	0	1	1	1	109
MISSES	4	10	9	4	9

T77	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	2	7	3	3	68
MISSES	2	4	7	2	50

T102	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	0	1	5	3	75
MISSES	4	10	5	2	43

T37	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	3	5	7	5	32
MISSES	1	6	3	0	86

T53	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	1	4	7	5	98
MISSES	3	7	3	0	20

BASE 13

T42	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	1	7	9	5	91
MISSES	3	4	1	0	27

T72	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	1	7	8	5	79
MISSES	3	4	2	0	39

T60	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	1	6	5	4	85
MISSES	3	5	5	1	33

T34	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	1	2	5	4	86
MISSES	3	9	5	1	32

T123	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	1	2	6	5	77
MISSES	3	9	4	0	41

BASE 14

T84	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	1	4	7	4	85
MISSES	3	7	3	1	33

T147	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	2	10	5	5	48
MISSES	2	1	5	0	70

T143	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	3	6	1	2	81
MISSES	1	5	9	3	37

ULTRA SONIC

BASE 14

T151	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	2	2	2	3	89
MISSES	2	9	8	2	29

T32	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	1	7	4	2	66
MISSES	3	4	6	3	52

T150	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	1	8	5	4	43
MISSES	3	3	5	1	75

T8	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	0	3	3	0	79
MISSES	4	8	7	5	39

T94	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	1	1	1	2	89
MISSES	3	10	9	3	29

BASE 15

T96	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	2	7	7	5	115
MISSES	2	4	3	0	3

T48	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	0	5	8	3	98
MISSES	4	6	2	0	20

T127	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	0	5	4	3	87
MISSES	4	6	6	2	31

T71	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	0	1	3	1	88
MISSES	4	10	7	4	30

T136	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	3	4	6	0	71
MISSES	1	7	4	3	47

T5	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	2	1	3	1	89
MISSES	2	10	7	4	29

BASE 16

T131	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	0	3	6	3	113
MISSES	4	8	4	2	5

T62	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	1	2	1	2	96
MISSES	3	9	9	3	20

ULTRA SONIC BASE 16

T82		SMALL	MEDIUM	LARGE	XLARGE	NONE
	HITS	0	4	4	4	67
	MISSES	4	7	6	1	51

T139		SMALL	MEDIUM	LARGE	XLARGE	NONE
	HITS	0	3	4	3	78
	MISSES	4	8	6	2	40

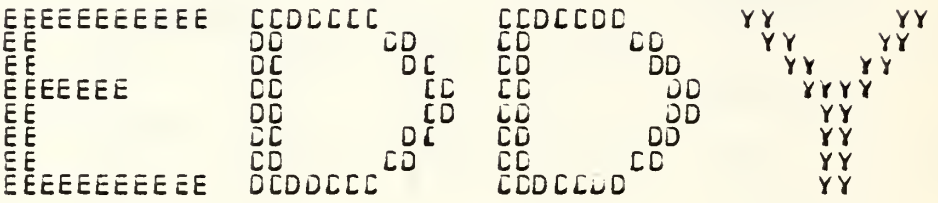
T63		SMALL	MEDIUM	LARGE	XLARGE	NONE
	HITS	0	1	2	2	98
	MISSES	4	10	8	3	20

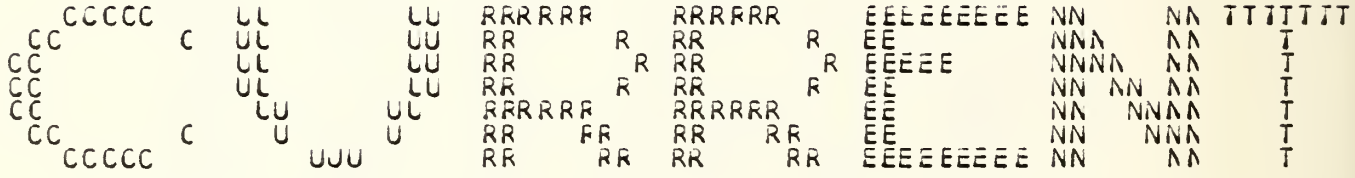
: BASE1 DATA A1 NAVAL POSTGRADUATE SCHOOL

EDDY CURRENT BASE 1

		SMALL	MEDIUM	LARGE	XLARGE	NONE
T109	HITS	7	11	6	4	113
	MISSES	3	0	0	0	4
T140	HITS	6	7	6	4	114
	MISSES	4	4	0	0	3
T4	HITS	6	6	6	4	114
	MISSES	4	5	0	0	3
T73	HITS	4	10	6	4	108
	MISSES	6	1	0	0	9
T101	HITS	3	5	5	4	113
	MISSES	7	6	1	0	4
T128	HITS	8	11	6	4	86
	MISSES	2	0	0	0	31
T33	HITS	4	7	6	4	104
	MISSES	6	4	0	0	13
T116	HITS	2	7	5	0	88
	MISSES	8	4	1	4	29
T3	HITS	6	10	5	4	62
	MISSES	4	1	1	0	55
T115	HITS	2	7	4	4	85
	MISSES	8	4	2	0	32
T54	HITS	1	7	1	4	94
	MISSES	9	4	5	0	23
T129	HITS	1	5	6	4	79
	MISSES	9	6	0	0	38
T12	HITS	1	5	4	1	97
	MISSES	9	6	2	3	50
T112	HITS	9	10	5	4	23
	MISSES	1	1	1	0	94
T79	HITS	8	10	5	4	7
	MISSES	2	1	1	0	110

APPENDIX V





THE ATTACHED PAGES LIST ALL THE TECHNICIANS WHO PARTICIPATED IN THE EDDY CURRENT PROFICIENCY TEST, BY NAME, FOR EACH BASE. THE PERFORMANCE OF EACH TECHNICIAN IS DESCRIBED BY NUMBER OF HITS AND MISSES HE SCORED, FOR THE FOUR DIFFERENT FLAW SIZES AND FOR THE UNFLAWED HOLES (THE COLUMN MARKED NONE; IN THIS COLUMN A HIT MEANS HE DID NOT MARK THE SITE).

EDDY CURRENT BASE 2

		SMALL	MEDIUM	LARGE	XLARGE	NONE
T1C	HITS	4	6	5	4	113
	MISSES	6	5	1	0	4
T13	HITS	4	6	4	1	102
	MISSES	6	5	2	3	15
T2C	HITS	5	6	6	4	100
	MISSES	5	5	0	0	17
T29	HITS	4	7	6	4	107
	MISSES	6	4	0	0	10
T122	HITS	2	7	6	4	115
	MISSES	8	4	0	0	4
T144	HITS	3	5	6	4	117
	MISSES	7	6	0	0	0
T148	HITS	9	10	6	4	89
	MISSES	1	1	0	0	28
T9C	HITS	6	11	6	4	114
	MISSES	4	0	0	0	3
T1C0	HITS	6	11	5	4	115
	MISSES	4	0	1	0	2
T135	HITS	8	11	6	4	111
	MISSES	2	0	0	0	6
T4C	HITS	6	10	6	4	114
	MISSES	4	1	0	0	3
T3E	HITS	5	8	6	4	117
	MISSES	5	3	0	0	0
T11	HITS	9	10	5	3	107
	MISSES	1	1	1	1	10
T152	HITS	4	9	6	4	113
	MISSES	6	2	0	0	4
T142	HITS	9	10	6	4	105
	MISSES	1	1	0	0	12
T133	HITS	9	10	6	4	105
	MISSES	1	1	0	0	12

EDDY CURRENT BASE 2

T61	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	2	9	6	4	113
MISSES	8	2	0	0	4

T145	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	6	7	6	4	108
MISSES	4	4	0	0	9

T134	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	2	8	5	4	116
MISSES	8	3	1	0	1

T59	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	5	10	6	4	113
MISSES	5	1	0	0	4

T43	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	7	11	6	4	113
MISSES	3	0	0	0	4

T117	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	6	11	6	4	115
MISSES	4	0	0	0	2

T121	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	6	11	6	4	94
MISSES	4	0	0	0	23

T16	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	6	10	6	4	99
MISSES	4	1	0	0	18

BASE 3

T103	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	6	11	6	4	114
MISSES	4	0	0	0	3

T9	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	10	10	4	1	104
MISSES	0	1	2	3	13

T105	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	6	10	6	4	114
MISSES	4	1	0	0	3

T118	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	5	11	6	4	112
MISSES	5	0	0	0	5

T39	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	3	9	5	4	117
MISSES	7	2	1	0	0

T120	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	4	11	5	4	114
MISSES	6	0	1	0	3

EDDY CURRENT

BASE 3

		SMALL	MEDIUM	LARGE	XLARGE	NONE
T68	HITS	0	9	5	4	117
	MISSES	10	2	1	0	0
T75	HITS	3	7	4	2	107
	MISSES	7	4	2	2	10
T22	HITS	9	10	6	4	100
	MISSES	1	1	0	0	17
T58	HITS	9	10	6	4	98
	MISSES	1	1	0	0	19
T57	HITS	4	11	4	4	109
	MISSES	6	0	2	0	8
T8C	HITS	7	11	5	4	91
	MISSES	3	0	1	0	26
T27	HITS	2	6	4	4	96
	MISSES	8	5	2	0	21
T15	HITS	5	6	1	1	96
	MISSES	5	5	5	3	21
T95	HITS	5	10	6	4	88
	MISSES	5	1	0	0	29
T149	HITS	3	7	4	4	81
	MISSES	7	4	2	0	36
T5C	HITS	5	8	4	4	83
	MISSES	5	3	2	0	54

BASE 4

		SMALL	MEDIUM	LARGE	XLARGE	NONE
T3C	HITS	9	10	5	4	115
	MISSES	1	1	1	0	2
T19	HITS	4	6	5	3	101
	MISSES	6	5	1	1	16
T138	HITS	6	9	5	3	93
	MISSES	4	2	1	1	24
T126	HITS	6	8	5	2	90
	MISSES	4	3	1	2	19

EDDY CURRENT BASE 4

T124	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	2	4	4	4	95
MISSES	8	7	2	0	22

BASE 5

T52	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	9	11	6	4	116
MISSES	1	0	0	0	1

T78	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	8	6	6	4	117
MISSES	2	5	0	0	0

T110	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	9	8	6	4	109
MISSES	1	3	0	0	8

T130	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	6	3	4	1	109
MISSES	4	8	2	3	8

T114	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	7	9	6	4	110
MISSES	3	2	0	0	7

T137	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	7	7	6	4	102
MISSES	3	4	0	0	15

T45	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	7	6	6	4	111
MISSES	3	5	0	0	6

T70	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	6	8	6	4	71
MISSES	4	3	0	0	46

BASE 6

T47	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	6	6	6	4	116
MISSES	4	5	0	0	1

T146	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	8	10	6	4	107
MISSES	2	1	0	0	10

T23	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	4	8	6	4	111
MISSES	6	3	0	0	6

T107	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	2	7	5	4	92
MISSES	8	4	1	0	25

EDDY CURRENT

BASE 6

		SMALL	MEDIUM	LARGE	XLARGE	NONE
T36	HITS	3	4	5	4	98
	MISSES	7	7	1	0	19
T141	HITS	5	9	6	3	72
	MISSES	5	2	0	1	45
T81	HITS	6	5	5	4	58
	MISSES	4	6	1	0	59

BASE 7

		SMALL	MEDIUM	LARGE	XLARGE	NONE
T74	HITS	7	9	6	4	116
	MISSES	3	2	0	0	1
T91	HITS	5	9	6	4	112
	MISSES	5	2	0	0	5
T106	HITS	1	7	6	4	117
	MISSES	9	4	0	0	0
T92	HITS	3	5	6	4	116
	MISSES	7	6	0	0	1
T111	HITS	2	10	6	4	111
	MISSES	8	1	0	0	6
T51	HITS	4	9	5	4	110
	MISSES	6	2	1	0	7
T64	HITS	4	9	6	4	108
	MISSES	6	2	0	0	9
T132	HITS	7	7	6	4	106
	MISSES	3	4	0	0	11
T17	HITS	8	7	6	4	102
	MISSES	2	4	0	0	15
T85	HITS	3	8	5	4	85
	MISSES	7	3	1	0	32

EDDY CURRENT BASE 8

		SMALL	MEDIUM	LARGE	XLARGE	NONE
T14	HITS	2	6	3	3	82
	MISSES	8	5	3	1	35
T97	HITS	10	11	6	4	112
	MISSES	0	0	0	0	5
T99	HITS	8	10	6	4	113
	MISSES	2	1	0	0	4
T125	HITS	7	10	6	4	112
	MISSES	3	1	0	0	5
T76	HITS	4	9	6	4	114
	MISSES	6	2	0	0	3
T4C	HITS	7	10	6	3	104
	MISSES	3	1	0	1	13
T25	HITS	0	6	6	4	114
	MISSES	10	5	0	0	3
T65	HITS	6	10	6	4	97
	MISSES	4	1	0	0	20
T35	HITS	5	8	6	4	101
	MISSES	5	3	0	0	16
T86	HITS	5	7	6	3	103
	MISSES	5	4	0	1	14
T83	HITS	9	11	6	4	72
	MISSES	1	0	0	0	45
T88	HITS	10	11	6	4	77
	MISSES	0	0	0	0	40
T28	HITS	5	10	6	4	88
	MISSES	5	1	0	0	29
T89	HITS	1	4	5	4	99
	MISSES	9	7	1	0	18

EDDY CURRENT 1

BASE 10

T7		SMALL	MEDIUM	LARGE	XLARGE	NONE
	HITS	8	11	6	4	113
	MISSES	2	0	0	0	4

T55		SMALL	MEDIUM	LARGE	XLARGE	NONE
	HITS	7	5	4	1	116
	MISSES	3	6	2	3	1

T24		SMALL	MEDIUM	LARGE	XLARGE	NONE
	HITS	5	4	4	2	89
	MISSES	5	7	2	2	28

BASE 11

T69		SMALL	MEDIUM	LARGE	XLARGE	NONE
	HITS	6	9	6	3	97
	MISSES	4	2	0	1	20

T119		SMALL	MEDIUM	LARGE	XLARGE	NONE
	HITS	3	5	5	3	89
	MISSES	7	6	1	1	28

BASE 12

T37		SMALL	MEDIUM	LARGE	XLARGE	NONE
	HITS	8	11	6	3	117
	MISSES	2	0	0	1	0

T67		SMALL	MEDIUM	LARGE	XLARGE	NONE
	HITS	7	11	6	4	117
	MISSES	3	0	0	0	0

T102		SMALL	MEDIUM	LARGE	XLARGE	NONE
	HITS	8	11	6	4	110
	MISSES	2	0	0	0	7

T6		SMALL	MEDIUM	LARGE	XLARGE	NONE
	HITS	10	11	5	4	98
	MISSES	0	0	1	0	19

T53		SMALL	MEDIUM	LARGE	XLARGE	NONE
	HITS	7	11	6	4	88
	MISSES	3	0	0	0	29

BASE 13

T42		SMALL	MEDIUM	LARGE	XLARGE	NONE
	HITS	9	11	6	4	111
	MISSES	1	0	0	0	6

T34		SMALL	MEDIUM	LARGE	XLARGE	NONE
	HITS	6	9	5	4	107
	MISSES	4	2	1	0	10

EDDY CURRENT BASE 13

T72	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	7	9	6	3	104
MISSES	3	2	0	1	13

T60	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	6	10	6	4	95
MISSES	4	1	0	0	22

T123	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	8	11	6	4	72
MISSES	2	0	0	0	45

BASE 14

T84	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	5	6	4	1	109
MISSES	5	5	2	3	8

T32	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	6	8	6	4	101
MISSES	4	3	0	0	16

T143	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	6	7	5	3	113
MISSES	4	4	1	1	4

T94	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	1	4	5	4	109
MISSES	9	7	1	0	8

T8	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	6	7	5	4	82
MISSES	4	4	1	0	35

T151	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	3	6	4	3	95
MISSES	7	5	2	1	22

T147	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	3	8	5	3	43
MISSES	7	3	1	1	74

T150	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	5	4	5	1	52
MISSES	5	7	1	3	65

BASE 15

T96	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	7	11	6	4	117
MISSES	3	0	0	0	0

T48	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	6	9	6	4	116
MISSES	4	2	0	0	1

ECDY CURRENT BASE 15

T5	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	4	9	6	4	113
MISSES	6	2	0	0	4

T71	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	4	6	6	4	116
MISSES	6	5	0	0	1

T127	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	6	10	6	4	99
MISSES	4	1	0	0	18

T136	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	6	5	5	1	92
MISSES	4	6	1	3	25

BASE 16

T82	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	4	10	6	4	106
MISSES	6	1	0	0	11

T131	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	7	9	5	3	96
MISSES	3	2	1	1	21

T139	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	2	9	5	4	57
MISSES	8	2	1	0	60

T62	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	4	4	3	2	77
MISSES	6	7	3	2	40

T63	SMALL	MEDIUM	LARGE	XLARGE	NONE
HITS	3	2	3	3	85
MISSES	7	9	3	1	32

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